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Data Bases and
Data Base Systems
A Bibliography
with Indexes

NASA SP-7045
June 1981

National Aeronautics and
Space Administration

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NASA SP-7045

DATA BASES
AND
DATA BASE SYSTEMS
Related to NASA's Aerospace Program

A Bibliography
With Indexes

A selection of annotated references to unclassified reports and journal articles entered into the NASA scientific and technical information system from 1975 through 1980 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1981
National Aeronautics and Space Administration
Washington, DC

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INTRODUCTION

The purpose of this directory is to assist NASA Center and contractor people, as well as others, to locate numerical and factual data bases and data base handling and management systems that may be of use to them. The references have been compiled from the NASA scientific and technical information data base, selecting from items indexed under 'data bases.' These items appeared in *Scientific and Technical Aerospace Reports (STAR)* and *International Aerospace Abstracts (IAA)* 1975-1980.

Few of the references will describe the data bases and systems in full. Most references serve primarily as an indication that there may be a data base or system of interest or application, which the potential user can track down.

Data gathering has, in general, not been included; emphasis is on data after it has been acquired and systems to manipulate it. Strictly bibliographical data bases have not been included; the intent is that the directory will serve as a locator for factual and numerical data bases and systems. Defense, military, environmental, and other subject areas which are only partially within scope of NASA's efforts have been further limited here to those of most apparent usefulness. Hardware, software, and theory have been included where they seemed of concrete usefulness.

Special effort has been made to include items dealing with highly specialized areas in science and engineering, such as aeronautics, astronautics, materials, space science, space transportation, chemistry, life sciences, logistics, and management.

For availability of data bases in space science and supportive areas the searcher should also consult the National Space Science Data Center (Telephone: 301-344-6695; FTS 344-6695) at Goddard Space Flight Center, Greenbelt, MD 20771. Data which NSSDC makes available consists of (1) data acquired by satellites; and (2) ground-based data, models, computer routines, and composite spacecraft data.

Data related to satellite coverage of the earth's surface will be found in the quarterly bibliography *Earth Resources* (NASA SP-7041).

AVAILABILITY OF CITED PUBLICATIONS

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All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $7.00 per document up to a maximum of 40 pages. The charge for each additional page is $0.25. Microfiche[1] of documents announced in *IAA* are available at the rate of $3.00 per microfiche on demand, and at the rate of $1.25 per microfiche for standing orders for all *IAA* microfiche. The price for the *IAA* microfiche by category is available at the rate of $1.50 per microfiche plus a $1.00 service charge per category per issue. Microfiche of all the current AIAA Meeting Papers are available on a standing order basis at the rate of $1.50 per microfiche.

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TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 1

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Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

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Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

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Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications*.

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Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

06 AIRCRAFT INSTRUMENTATION 17

Includes cockpit and cabin display devices, and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

07 AIRCRAFT PROPULSION AND POWER 19

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

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For related information see also *14 Ground Support Systems and Facilities (Space)*.

ASTRONAUTICS

Includes astronautics (generzl); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

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18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 30

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Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

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For related information see also *Physics*.

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SPACE SCIENCES

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GENERAL

99 GENERAL N.A.

Note: N.A. means that no abstracts were assigned to this category for this issue.

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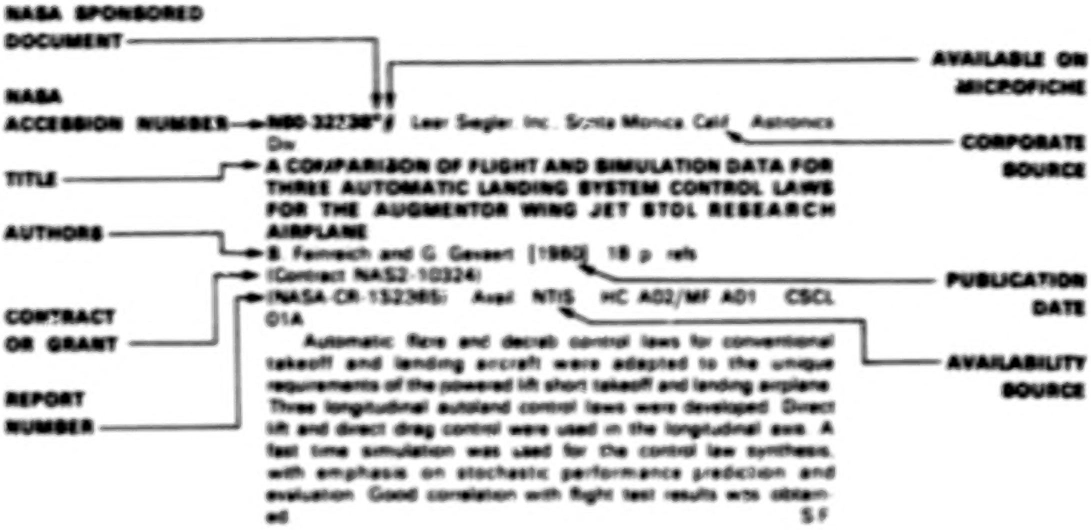
TYPICAL CITATION AND ABSTRACT FROM *STAR*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N80-32738*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.

A COMPARISON OF FLIGHT AND SIMULATION DATA FOR THREE AUTOMATIC LANDING SYSTEM CONTROL LAWS FOR THE AUGMENTOR WING JET STOL RESEARCH AIRPLANE

B. Feinreich and G. Gevaert [1980] 18 p refs
(Contract NAS2-10324)
(NASA-CR-152385) Avail: NTIS HC A02/MF A01 CSCL 01A

Automatic flare and decrab control laws for conventional takeoff and landing aircraft were adapted to the unique requirements of the powered lift short takeoff and landing airplane. Three longitudinal autoland control laws were developed. Direct lift and direct drag control were used in the longitudinal axis. A fast time simulation was used for the control law synthesis, with emphasis on stochastic performance prediction and evaluation. Good correlation with flight test results was obtained. S.F.

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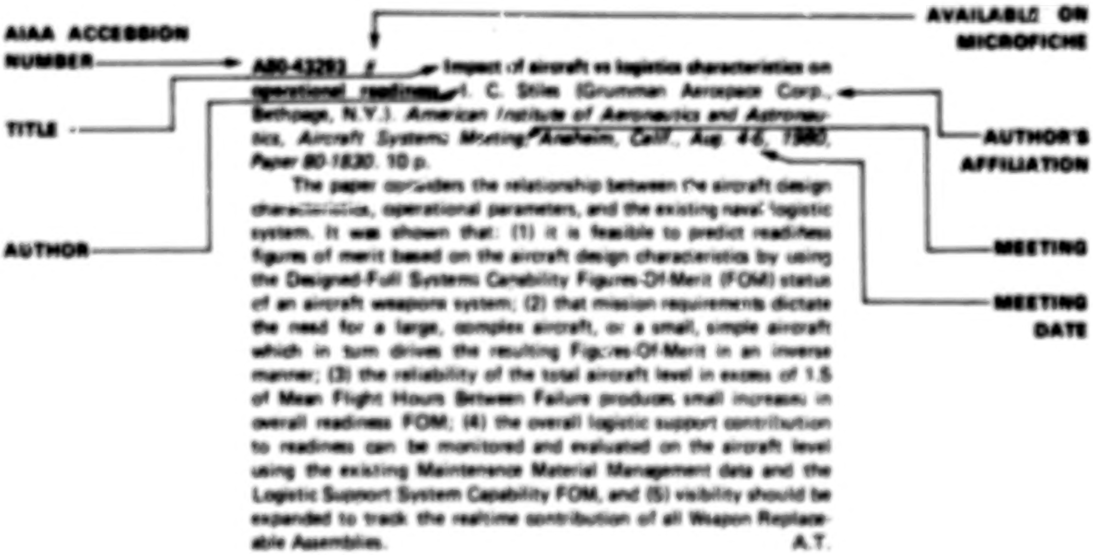
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A80-43293 # **Impact of aircraft vs logistics characteristics on operational readiness.** J. C. Stiles (Grumman Aerospace Corp., Bethpage, N.Y.). *American Institute of Aeronautics and Astronautics, Aircraft Systems Meeting, Anaheim, Calif., Aug. 4-6, 1980, Paper 80-1830.* 10 p.

The paper considers the relationship between the aircraft design characteristics, operational parameters, and the existing naval logistic system. It was shown that: (1) it is feasible to predict readiness figures of merit based on the aircraft design characteristics by using the Designed-Full Systems Capability Figures-Of-Merit (FOM) status of an aircraft weapons system; (2) that mission requirements dictate the need for a large, complex aircraft, or a small, simple aircraft which in turn drives the resulting Figures-Of-Merit in an inverse manner; (3) the reliability of the total aircraft level in excess of 1.5 of Mean Flight Hours Between Failure produces small increases in overall readiness FOM; (4) the overall logistic support contribution to readiness can be monitored and evaluated on the aircraft level using the existing Maintenance Material Management data and the Logistic Support System Capability FOM, and (5) visibility should be expanded to track the realtime contribution of all Weapon Replaceable Assemblies. A.T.

DATA BASES AND DATA BASE SYSTEMS

A Bibliography

JUNE 1981

01 AERONAUTICS (GENERAL)

A80-43283 # **Impact of aircraft vs logistics characteristics on operational readiness.** I. C. Stiles (Grumman Aerospace Corp., Bethpage, N.Y.). *American Institute of Aeronautics and Astronautics, Aircraft Systems Meeting, Anaheim, Calif., Aug. 4-6, 1980, Paper 80-1830.* 10 p.

The paper considers the relationship between the aircraft design characteristics, operational parameters, and the existing naval logistic system. It was shown that: (1) it is feasible to predict readiness figures of merit based on the aircraft design characteristics by using the Designed-Full Systems Capability Figures-Of-Merit (FOM) status of an aircraft weapons system; (2) that mission requirements dictate the need for a large, complex aircraft, or a small, simple aircraft which in turn drives the resulting Figures-Of-Merit in an inverse manner; (3) the reliability of the total aircraft level in excess of 1.5 of Mean Flight Hours Between Failure produces small increases in overall readiness FOM; (4) the overall logistic support contribution to readiness can be monitored and evaluated on the aircraft level using the existing Maintenance Material Management data and the Logistic Support System Capability FOM, and (5) visibility should be expanded to track the realtime contribution of all Weapon Replaceable Assemblies. A.T.

N79-13002# General Dynamics/Convair, San Diego, Calif. Aerospace Div.
F-106 SCHEDULED MAINTENANCE IMPROVEMENT SUMMARY
Nov. 1972 13 p
(Contract F41608-71-D-1383)
(AD-A045400; GDCA-AHD72-008) Avail: NTIS HC A02/MF A01 CSCL 01/3

The primary objective was to provide an improved scheduled maintenance program for the F-106 that will reduce weapon system operating costs without adversely affecting aircraft safety and reliability. The second objective was to provide the methodology used to perform the F-106 study in a format suitable for usage on other Air Force aircraft. Convair successfully accomplished both of these objectives. GRA

N79-20051*# Operations Research, Inc., Silver Spring, Md.
AVIATION SYSTEM MODELING STUDY AND ALTERNATIVES Final Report
7 Oct. 1975 10 p
(Contract NAS5-24033)
(NASA-CR-158715) Avail: NTIS HC A02/MF A01 CSCL 01B

The Aviation System Modeling Study was directed toward two primary goals: an improved understanding of the U.S. aviation system, and technology. There are three major categories into which the individual study efforts may be subdivided. These three categories are: special issue studies, task studies, and data base development. Author

N79-12003# Michigan State Univ., East Lansing.
CORROSION TRACKING AND PREDICTION FOR C-141A AIRCRAFT MAINTENANCE SCHEDULING Final Report, Sep. 1976 - Oct. 1977
Robert Summitt Wright-Patterson AFB, Ohio AFML Apr. 1978 242 p refs
(Contract F33615-75-C-5284)
(AD-A057984; AFML-TR-78-29) Avail: NTIS HC A11/MF A01 CSCL 01/3

Analysis of corrosion maintenance and utilization histories of C-141A aircraft has shown that these records can be used to develop a corrosion-prediction model. Exploitation of such a model could result in better efficiency in the use of aircraft, maintenance facilities, and manpower, since corrosion maintenance could be scheduled at the optimum time with respect to repairability, need, and available resources. The USAF Maintenance Data Collection System does not generate sufficiently accurate and consistent records, however, to base a prediction model on existing data. A number of changes to the System would improve the quality of the data sufficiently so that an effective model could be developed. Potential cost benefits are far larger than those needed to effect the changes, hence the recommended changes should be implemented at an early date. Author (GRA)

N79-[illegible]140# Administrative Sciences Corp., Alexandria, Va.
NAVAL AIRCRAFT OPERATING AND SUPPORT COST-ESTIMATING MODEL, FY 1977 REVISION
Feb. 1979 199 p refs Revised
(Contract N00014-77-C-0180)
(AD-A068175; ASC-R-120; ASC-R-118-Rev) Avail: NTIS HC A09/MF A01 CSCL 05/1

In fiscal year 1974, Administrative Science Corp. developed a parametric cost-estimating model which has been updated and documented several times and used to support numerous Defense Systems Acquisition Review Council (DSARC) reviews as well as other cost reviews. This report provides a detailed documentation of the cost-estimating relationships (CER's) developed from FY-77 data. In addition, the report has been significantly enhanced in order to serve as a handbook and training aid for Op-96D aircraft analysts. For each cost element in the structure, this report provides: (1) a definition; (2) discussion of the definition and other aspects of how, where, and why these costs are incurred, points of contact including organizational codes and telephone numbers, historical data, and sources for planning data; (3) cost-estimating relationship, including all computational procedures, regression statistics for the CER, and the data base; (4) an alternative CER (in many cases) with the same detail as above; and, (5) an example calculation. GRA

N80-11029*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SUPERSONIC CRUISE RESEARCH (SCR) PROGRAM PUBLICATIONS FOR FISCAL YEAR 1977 THROUGH FISCAL YEAR 1979: PRELIMINARY BIBLIOGRAPHY

S. Hoffman Nov. 1979 43 p
(NASA-TM-80184; P3110) Avail: NTIS HC A03/MF A01
CSCL 01B

Approximately 512 bibliographies are presented for the time period from FY 77 to FY 79. Several non-SCR publications and a few papers not included in the last publication are included. Topics include propulsion, stratospheric emissions impact, materials and structure, aerodynamic performance, and stability and control. A.W.H.

N80-17022# Naval Air Engineering Center, Lakehurst, N.J. Engineering Dept.
COMPILATION OF DATA COVERING AIRCRAFT SERVICING FACILITIES ABOARD AVIATION AND AMPHIBIOUS AVIATION SHIPS
Michael A. Strano 17 Oct. 1979 279 p
(AD-A076443; NAEC-ENG-6703-Rev-15) Avail: NTIS
HC A13/MF A01 CSCL 01/3

This report is a compilation of data covering aircraft servicing facilities aboard aviation and amphibious aviation ships. Data is furnished on aircraft servicing facilities relating to fueling and defueling, electrical starting and servicing, oxygen and nitrogen, aircraft inertial alignment, compressed air, and cooling and starting air. GRA

N80-31324# Vought Corp., Dallas, Tex. Maintainability Engineering Group.
MAINTAINABILITY INDEX MODEL DATA BASE STUDY Final Report, Jul. 1970 - Sep. 1979
Dennis H. Kovatch 16 Jun. 1980 83 p refs
(Contract N00140-79-C-0445)
(AD-A087844; Rept-2-57404/OR-52451) Avail: NTIS
HC A05/MF A01 CSCL 01/3

This report presents a review of ten years of aircraft maintenance data and its effects on mathematical modeling. A Maintainability Index Model (MIM) was previously developed using 3-M data from the 1975-1976 time period. Since then, maintenance data for the aircraft used to develop the MIM has increased resulting in the model under predicting current year data by 40% and life cycle data by 18%. Because of the variability and instability of 3-M data, a recommendation is made to update the model annually on an interim basis through the use of Maintenance Inflation Factors and to provide a complete update of the MIM data base every five years. GRA

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

A77-19843 # **Transition induced by distributed roughness on blunt bodies in supersonic flow.** W. M. Bishop (Aerospace Corp., El Segundo, Calif.). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 15th, Los Angeles, Calif., Jan. 24-26, 1977, Paper 77-124.* 8 p. 22 refs.

An empirical model has been developed to correlate transition due to distributed roughnesses that range in height over five orders of magnitude. The data base is obtained from wind tunnels, arc heaters, and sounding rockets. The shapes included are hemispheres, biconics, and laminar stable. The correlation departs from previous attempts by dividing the body into two distinct regions: a forward region where concave streamline curvature dominates transition, and a following region where streamline curvature is not an influence. Noise is found to have little or no effect, and the extension of the correlation to roughnesses measured in microinches shows no observable smooth wall limit. (Author)

A78-32351 * # **An experiment for Shuttle aerodynamic force coefficient determination from inflight dynamical and atmospheric measurements.** H. R. Compton, R. C. Blanchard, and G. D. Walberg (NASA, Langley Research Center, Space Systems Div., Hampton, Va.). In: Aerodynamic Testing Conference, 10th, San Diego, Calif., April 19-21, 1978, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1978, p. 185-189. (AIAA 78-795)

A two-phase experiment is proposed which utilizes the Shuttle Orbiter and its unique series of repeated entries into the earth's atmosphere as an airborne in situ aerodynamic testing laboratory. The objective of the experiment is to determine static aerodynamic force coefficients, first of the orbiter, and later of various entry configurations throughout the high speed flight regime, including the transition from free molecule to continuum fluid flow. The objective will be accomplished through analysis of inflight measurements from both shuttle-borne and shuttle-launched instrumented packages. Results are presented to demonstrate the feasibility of such an experiment. (Author)

A79-19533 * # **Reynolds number, scale and frequency content effects on F-15 inlet instantaneous distortion.** C. H. Stevens, E. D. Spong (McDonnell Douglas Corp., St. Louis, Mo.), J. Nugent (NASA, Flight Research Center, Edwards, Calif.), and H. E. Neumann (NASA, Lewis Research Center, Cleveland, Ohio). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 17th, New Orleans, La., Jan. 15-17, 1979, Paper 79-0104.* 11 p. 6 refs.

An inlet instantaneous distortion study program sponsored by NASA was recently completed using an F-15 fighter aircraft. Peak distortion data from subscale inlet model wind tunnel tests are shown to be representative of full-scale flight test peak distortion. The effects on peak distortion are investigated for engine presence, Reynolds number, scale and frequency content. Data are presented which show that: (1) the effect of engine presence on total pressure recovery, peak distortion, and turbulence is small but favorable, (2) increasing the Reynolds number increases total pressure recovery, decreases peak distortion, and decreases turbulence, and (3) increasing the filter cutoff frequency increases the calculated values of both peak distortion and turbulence. (Author)

A79-23508 * # **Simulation of three-dimensional compressible viscous flow on the Illiac IV computer.** T. H. Pulliam and H. Lomax (NASA, Ames Research Center, Moffett Field, Calif.). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 17th, New Orleans, La., Jan. 15-17, 1979, Paper 79-0206.* 10 p. 11 refs.

Complicated three-dimensional viscous transonic flows about bodies at high angles of attack are solved on the Illiac IV computer. It is shown that certain approximate forms of the compressible Reynolds-averaged Navier-Stokes equations can be computed about realistic three-dimensional geometries with relative ease on the Illiac IV. The ease and efficiency with which this can be done depend on the approximations made in the basic equations, the choice of the numerical algorithm used for the solution, and the data-base system that controls the data management and identifies and manipulates the vectors. A pencil data-base system is found to be particularly suitable for the approximations and numerical method chosen to produce the results presented. In addition, some comparisons are made of computer predictions with experimental results for various lows about hemisphere-cylinders in both subsonic and supersonic free streams. The same viscous model and numerical model are used, showing good qualitative agreement in the location of separation lines and pressure distributions. S.D.

N75-17283*# Aerophysics Research Corp., Hampton, Va.
ODIN: OPTIMAL DESIGN INTEGRATION SYSTEM Final Report
C. R. Glatt and D. S. Hague Washington NASA Feb. 1975

95 p refs
(Contract NAS1-12008)
(NASA-CR-2492) Avail: NTIS HC $4.75 CSCL 01B

The report provides a summary of the Optimal Design Integration (ODIN) System as it exists at Langley Research Center. A discussion of the ODIN System, the executive program and the data base concepts are presented. Two examples illustrate the capabilities of the system which have been exploited. Appended to the report are a summary of abstracts for the ODIN library programs and a description of the use of the executive program in linking the library programs. Author

N78-30111*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A STOL AIRWORTHINESS INVESTIGATION USING A SIMULATION OF AN AUGMENTOR WING TRANSPORT. VOLUME 1: SUMMARY OF RESULTS AND AIRWORTHINESS IMPLICATIONS Final Report
Robert L. Stapleford (Systems Technol., Inc., Mountain View, Calif.), Robert K. Heffley (Systems Technol., Inc., Mountain View, Calif.), Charles S. Hynes, and Barry C. Scott (FAA, Moffett Field, Calif.) Oct. 1974 55 p refs Sponsored in part by FAA
(Contract NAS2-7926)
(NASA-TM-X-62395; AD-A005878; FAA-RD-74-179-Vol-1; A-5797-Vol-1) Avail: NTIS HC $4.25 CSCL 01A

A simulator study of STOL airworthiness criteria was conducted using a model of an augmentor wing transport. The approach, flare and landing, go-around, and takeoff phases of flight were investigated. The results are summarized and possible implications with regard to airworthiness criteria are discussed. The results provide a data base for future STOL airworthiness requirements and a preliminary indication of potential problem areas. The results are also compared to the results from an earlier simulation of the Breguet 941S. Where possible, airworthiness criteria are proposed for consideration. Author

N78-24186# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
PARACHUTE DESIGN AND PERFORMANCE DATA BANK Final Report, 1 Jul. 1970 - 30 Dec. 1973
James H. DeWeese and Robert McCarty Jan. 1975 121 p
(AF Proj. 6065)
(AD-A019491; AFFDL-TR-74-45) Avail: NTIS CSCL 01/3

The development and operation of a system for computer-aided design and performance analyses of parachutes are discussed. The rationale used in initial conceptual planning and in establishing the operational procedures employed is included. In addition, the mechanics involved in the information storage and retrieval tasks are presented. The data bank stores only design details and performance data which have been extracted from various sources. A FORTRAN extended program providing highly flexible and very selective retrieval operates on the accumulated information base. Procedures for utilization of the data bank, current project status, and plans are outlined. GRA

N78-27196# Naval Surface Weapons Center, White Oak, Md.
INDUCED SIDE FORCES ON BODIES OF REVOLUTION AT HIGH ANGLE OF ATTACK
Andrew B. Wardlaw and Alfred M. Morrison 1 Nov. 1975 40 p refs
(AD-A020356; NSWC/WOL/TR-75-176) Avail: NTIS CSCL 20/4

Linear regression techniques are used to establish a quantitive description of side forces on bodies at high incidence. A data base is assembled concerning the key side force characteristics of maximum observed side force, angle of occurrence, and minimum angle of attack at which a side force is observed. This information is examined to determine the important trends and a predictive model for side force based on the crossflow analogy is developed to suggest other important variables. A linear regression model for these quantities is developed to include only those variables which are statistically significant. GRA

N78-12008*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AN EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF PROPROTOR WHIRL FLUTTER
Raymond G. Kvaternik and Jerome S. Kohn (Grumman Aerospace Corp., Bethpage, N. Y.) Dec. 1977 76 p refs
(NASA-TP-1047; L-11658) Avail: NTIS HC A05/MF A01 CSCL 01A

The results of an experimental parametric investigation of whirl flutter are presented for a model consisting of a windmilling propeller-rotor, or proprotor, having blades with offset flapping hinges mounted on a rigid pylon with flexibility in pitch and yaw. The investigation was motivated by the need to establish a large data base from which to assess the predictability of whirl flutter for a proprotor since some question has been raised as to whether flutter in the forward whirl mode could be predicted with confidence. To provide the necessary data base, the parametric study included variation in the pylon pitch and yaw stiffnesses, flapping hinge offset, and blade kinematic pitch-flap coupling over a large range of advance ratios. Cases of forward whirl flutter and of backward whirl flutter are documented. Measured whirl flutter characteristics were shown to be in good agreement with predictions from two different linear stability analyses which employed simple, two dimensional, quasi-steady aerodynamics for the blade loading. On the basis of these results, it appears that proprotor whirl flutter, both forward and backward, can be predicted. Author

N78-22080# ARO, Inc., Arnold Air Force Station, Tenn.
AN AERODYNAMIC COEFFICIENT PREDICTION TECHNIQUE FOR SLENDER BODIES WITH LOW ASPECT RATIO FINS AT MACH NUMBERS FROM 0.6 TO 3.0 AND ANGLES OF ATTACK FROM 0 TO 180 DEGREES Final Report, 1 Jul. 1974 - 1 Aug. 1977
William B. Baker, Jr. Mar. 1978 361 p refs
(AD-A051797; AEDC-TR-77-97) Avail: NTIS HC A16/MF A01 CSCL 20/4

In order to extend the state-of-the-art aerodynamic coefficient prediction methodology at high angles of attack, a semi-empirical prediction technique has been developed for the prediction of normal force and pitching moment coefficients for slender body alone and slender body plus fin configurations. Additionally, installed fin normal force, root bending and hinge moment coefficients are calculated. The semi-empirical prediction technique is valid for slender bodies with low aspect ratio fins at Mach numbers from 0.6 to 3.0 and angles of attack from 0 to 180 degrees. The range of validity of the prediction technique for the low aspect ratio fins is: aspect ratio from 0.5 to 2.0; taper ratio from 0 to 1.0 and span ratio from 0.3 to 0.5. Wind tunnel testing was accomplished in order to provide the data base from which the prediction technique was derived. The data base provides the first parametric set of data at angles of attack, from 0 to 180 degrees, and not only provided the base for the semi-empirical prediction technique developed herein, but will provide a standard of comparison for high angle of attack prediction methodology developed in the future. Author (GRA)

N78-27078 Tennessee Univ., Knoxville.
AN AERODYNAMIC COEFFICIENT PREDICTION TECHNIQUE FOR SLENDER BODIES WITH LOW ASPECT RATIO FINS AT TRANSONIC MACH NUMBERS AND ANGLES OF ATTACK TO 180 DEGREES Ph.D. Thesis
William Bertram Baker, Jr. 1978 307 p
Avail: Univ. Microfilms Order No. 7807674

A semiempirical technique was developed for the prediction of normal force and pitching moment coefficients for a slender body alone and slender body plus fin configurations. Additionally, installed fin normal force, root bending and hinge moment coefficients were calculated. The semi-empirical prediction technique is valid for slender bodies with low aspect ratio fins at Mach numbers from 0.6 to 1.3 and angles of attack from 0 to 180 degrees. The range of validity of the prediction technique for the low aspect ratio from 0.5 to 2.0; taper ratio from 0 to 1.0 and span ratio from 0.3 to 0.5. Dissert. Abstr.

N78-31046# Naval Air Test Center, Patuxent River, Md. Strike Aircraft Test Directorate.

MAXIMUM LIKELIHOOD IDENTIFICATION OF THE LONGITUDINAL AERODYNAMIC COEFFICIENTS OF THE EA-6B AIRPLANE IN THE CATAPULT LAUNCH CONFIGURATION

David E. Bischoff 8 May 1978 34 p refs
(AD-A054243; NATC-TM-78-2-SA) Avail: NTIS HC A03/MF A01 CSCL 01/3

The aerodynamic coefficients describing the longitudinal equations of motion of the EA-6B airplane with landing gear and flaps down were determined from flight test data through use of a maximum likelihood identification algorithm. These identified coefficients were accurately determined and were utilized to both: (1) predict short and long period time history responses and (2) duplicate the results of conventional flight test specification requirement test procedures. The identified results provide an example of the type of information available through the application of parameter estimation technology in the areas of airplane data base generation. These data can be utilized for ACLS and Operational Flight Trainer simulations as well as for parametric studies of aerodynamic characteristics. Author (GRA)

N78-32073# National Technical Information Service, Springfield, Va.

LIGHTER THAN AIR VEHICLES. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Mar. 1978

Guy E. Habercom, Jr. May 1978 82 p Supersedes NTIS/PS-77/0375
(NTIS/PS-78/0410/7; NTIS/PS-77/0375) Avail: NTIS HC $28.00/MF $28.00 CSCL 01C

Design and applications of balloons, dirigibles, and airships are investigated in these reports gathered in a worldwide literature survey. Passenger or cargo transport, timbering, tethering, and fabric selection are among the aspects investigated. GRA

N79-14026# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.

AIRCRAFT WAKE VORTEX CHARACTERISTICS FROM DATA MEASURED AT JOHN F. KENNEDY INTERNATIONAL AIRPORT Final Report, Jun. 1975 - Jun. 1977

W. R. Eberle, M. R. Brashears, A. D. Zalay, K.R. Shrider, and D. A. Love Mar. 1978 254 p refs
(Contract DOT-TSC-1023)
(AD-A055059; LMSC-HREC-TR-D568181; FAA-RD-78-47; FAA-78-5) Avail: NTIS HC A12/MF A01 CSCL 20/4

Data from 1320 aircraft flybys at Kennedy International Airport, Jamaica, New York, in 1975 were processed and stored in a computerized vortex data management system. The data were selectively recalled to determine vortex characteristics pertinent to the design of an effective wake vortex avoidance system. Vortex and meteorological characteristics which are relevant to the design of an effective wake vortex avoidance system are discussed from an analytical viewpoint as well as from an analysis of the data. Several formulations for feedback of vortex sensor information to provide vortex prediction are presented. Several wake vortex avoidance system designs are shown. Author (GRA)

N79-20088# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

A COMPARISON OF PANEL METHODS FOR SUBSONIC FLOW COMPUTATION

H. S. Sytsma (National Aerospace Lab., Amsterdam), B. L. Hewitt (British Aerospace, Lancaster, United Kingdom), and P. E. Rubbert (Boeing Military Airplane Development, Seattle) Feb. 1979 89 p refs
(AGARD-AG-241; ISBN-92-835-1312-6) Avail: NTIS HC A05/MF A01

A data base for a number of relatively simple wing configurations and nacelle configurations is presented. The data results were obtained from the Roberts (BAe) Spline-Neumann Program and a pilot version of the Boeing Advanced Panel-Type Influence Coefficient Method. In addition, results from the practical, engineering type application of several methods are compared with the data solutions. These comparisons suggest that of the methods considered the Boeing Advanced Panel-Type Influence Coefficient Method is the most efficient, in terms of accuracy/computation time ratio. J.M.S.

N79-22019*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

RECENT THEORETICAL DEVELOPMENTS AND EXPERIMENTAL STUDIES PERTINENT TO VORTEX FLOW AERODYNAMICS, WITH A VIEW TOWARDS DESIGN

John E. Lamar and James M. Luckring *In* AGARD High Angle of Attack Aerodyn. Jan. 1979 31 p refs

Avail: NTIS HC A23/MF A01 CSCL 01A

Recent progress in a research program directed toward an improved vortex flow technology base was reviewed. Analysis methods for conical flow and analysis and design methods for nonconical flows are presented. Applications are made for a variety of planar, nonplanar, and interferring lifting surfaces. Several methods are shown to provide reasonable estimates of over-all forces and moments for simple wing planforms with the suction analogy method currently offering the most versatility for arbitrary configuration applications. For the prediction of surface loadings the free vortex sheet method being developed by Boeing is shown to have considerable promise and further development of this type of method is encouraged. A data base for ogee strake-wing configurations is summarized with an emphasis on the requirements for maximizing the interference lift. A strake planform design procedure is discussed and a first solution (gothic in planview) is integrated with a wing body. The data show the strake to exhibit expected stable vortex characteristics. It was found that, apart from increasing sweep, conically cambered delta wings developed drag levels approaching that of attached flow with increasing either the lift or the wing camber height, lastly, an approximate vortex flow design method, based on the suction analogy, is outlined and an example is given. S.E.S.

N79-23032# Textron Bell Helicopter, Fort Worth, Tex.

OPERATIONAL LOADS SURVEY: DATA MANAGEMENT SYSTEM. VOLUME 1: USER'S MANUAL Final Report

Richard B. Philbrick and Alfred L. Eubanks Jan. 1979 166 p refs 2 Vol.
(Contract DAAJ02-77-C-0053; DA Proj. 1L2-62209-AH-76)
(AD-A065129; BHT-299-099-871-Vol-1; USARTL-TR-78-52A) Avail: NTIS HC A08/MF A01 CSCL 01/3

The Operational Loads Survey/Data Management System (OLS/DMS) was designed and programmed as a computer software tool for data management and processing of the Operational Loads Survey (OLS) test data base. With limited modification, the OLS/DMS will accommodate other large, time based, test data bases. The system transfers selected test data to a large, direct access disc file and maintains the data on a semi-permanent basis. Data are retrieved from this file, processed, and displayed interactively or in batch. Plot output is generated on a Tektronix 4014 or an incremental plotter (e.g., Calcomp). GRA

N79-23033# Textron Bell Helicopter, Fort Worth, Tex.

OPERATIONAL LOADS SURVEY: DATA MANAGEMENT SYSTEM. VOLUME 2: SYSTEMS MANUAL Final Report

Richard B. Philbrick and Alfred L. Eubanks Jan. 1979 127 p refs 2 Vol.
(Contract DAAJ02-77-C-0053; DA Proj. 1L2-62209-AH-76)
(AD-A065270; BHT-299-099-871-Vol-2; USARTL-TR-78-52B) Avail: NTIS HC A07/MF A01 CSCL 01/13

The Operational Loads Survey/Data Management System (OLS/DMS) was designed and programmed as a computer software tool for data management and processing of the Operational Loads Survey (OLS) test data base. With limited modification, the OLS/DMS will accommodate other large, time based, test data bases. The system transfers selected test data to a large, direct access disc file and maintains the data on a semi-permanent basis. Data are retrieved from this file, processed, and displayed interactively or in batch. Plot output is generated on a Tektronix 4014 or an incremental plotter (e.g., CALCOMP). A small sample of available processing options includes amplitude spectrum, harmonic analysis, digital filtering, blade static pressure coefficient, and blade normal force coefficient. This program will accommodate data from multiple sensors simultaneously for processing of functions with two geometric independent variables (e.g., chord and radius). This report is a systems manual for assistance in program maintenance, modification, and/or installation. GRA

N79-24884# Army Missile Research and Development Command, Redstone Arsenal, Ala. Technology Lab.
THE AERODYNAMIC CHARACTERISTICS OF THE FREE FLIGHT DEMONSTRATION ROCKET AT MACH NUMBERS FROM 0.4 TO 3.0
James A. Humphrey 22 Jan. 1979 170 p refs
(AD-A066733; DRDMI-T-79-26) Avail: NTIS HC A08/MF A01 CSCL 19/7

The Free Flight Rocket Technology Program generated a need for the Free Flight Demonstration Rocket test vehicle. This vehicle is to be used to determine the success of past efforts to improve free rocket accuracy. It will also be used as a data-gathering test bed to evaluate future improvements. As part of the Free Flight Demonstration Rocket design validation, a series of two wind tunnel tests was conducted at the Arnold Engineering Development Center to verify the predicted aerodynamic coefficients of the selected configuration. Author (GRA)

N79-30148# Northrop Corp., Hawthorne, Calif. Aircraft Group.
ANALYSIS OF WIND TUNNEL DATA PERTAINING TO HIGH ANGLE OF ATTACK AERODYNAMICS. VOLUME 1: TECHNICAL DISCUSSION AND ANALYSIS OF RESULTS Progress Report, Jun. 1977 - Apr. 1978
Jack W. Headley Jul. 1978 180 p 2 Vol.
(Contract F33615-77-C-3062; AF Proj. 2404)
(AD-A069646; NOR-78-69-Vol-1; AFFDL-TR-78-94-Vol-1)
Avail: NTIS HC A09/MF A01 CSCL 20/4

This report provides a technical discussion and analysis of wind tunnel data obtained from tests conducted on a family of Northrop fighter aircraft. These tests were performed mainly in the Northrop Low Speed Wind Tunnel, and cover the time period between 1966 and 1976. This report concentrates on data in the stall post-stall region, and for convenience is provided in two sections. This volume presents the results of the analysis of wind tunnel data which concentrates on the high angle of attack regime, and on three major aircraft components. These components are the nose and forebody, the wing leading edge extension, and the vertical tail. The effects of geometric changes in these components on the aircrafts' high angle of attack aerodynamics are analysed. Wherever possible design guidelines which identify the sensitivity of aerodynamic characteristics to geometric parameter variations are presented. Geometric changes or effects which were configuration dependent are also discussed. The second volume, Volume 2: 'Data base,' contains summaries of the wind tunnel tests which were selected to provide data for the analysis. GRA

N79-30149# Northrop Corp., Hawthorne, Calif. Aircraft Group.
ANALYSIS OF WIND TUNNEL DATA PERTAINING TO HIGH ANGLE OF ATTACK AERODYNAMICS. VOLUME 2: DATA BASE Progress Report, Jun. 1977 - Apr. 1978
Jack W. Headley Jul. 1978 571 p refs 2 Vol.
(Contract F33615-77-C-3062; AF Proj. 2404)
(AD-A069647; NOR-78-69-Vol-2; AFFDL-TR-78-94-Vol-2)
Avail: NTIS HC A24/MF A01 CSCL 20/4

This volume presents, in summary form, the geometric and aerodynamic data used as a basis for the design guidelines presented in Volume 1. The summaries have been divided into eight sections, the first seven being the low speed tests, which include almost all the configuration development studies and most of the high AOA testing. Data summaries for the transonic and supersonic testing form the eighth and last section. Because of the considerable quantity of data available from all the testing (some test reports containing as much as thirteen volumes), it is not practical to include the summaries in all the basic aerodynamic data available. In general, only the main aerodynamic effects are presented or summarized, and for more detailed information on a particular configuration, reference should be made to the actual wind tunnel report. All the data summaries are presented in a similar way, and include the following information: a data sheet including the test report title, a summary of the report, and the test conditions; a general three view of a representative test model configuration; detailed sketches of the pertinent configurations changes; and the relevant aerodynamic data. GRA

N79-30152*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
AERODYNAMIC RESISTANCE REDUCTION OF ELECTRIC AND HYBRID VEHICLES Progress Report, Sep. 1978
Apr. 1979 85 p refs
(Contracts NAS7-100; EM-78-I-01-4209)
(NASA-CR-162135; HCP/M5030-274) Avail: NTIS HC A05/MF A01 CSCL 01A

The generation of an EHV aerodynamic data base was initiated by conducting full-scale wind tunnel tests on 16 vehicles. Zero-yaw drag coefficients ranged from a high of 0.58 for a boxey delivery van and an open roadster to a low of about 0.34 for a current 4-passenger prototype automobile which was designed with aerodynamics as an integrated parameter. Characteristic effects of aspect ratio or fineness ratio which might appear if electric vehicle shape proportions were to vary significantly from current automobiles were identified. Some preliminary results indicate a 5 to 10% variation in drag over the range of interest. Effective drag coefficient wind-weighting factors over J227a driving cycles in the presence of annual mean wind fields were identified. Such coefficients, when properly weighted, were found to be from 5 to 65% greater than the zero-yaw drag coefficient in the cases presented. A vehicle aerodynamics bibliography of over 160 entries, in six general categories is included. DOE

N79-30162# National Technical Information Service, Springfield, Va.
LIGHTER THAN AIR VEHICLES. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Mar. 1979
Guy E. Habercom, Jr. May 1979 256 p Supersedes NTIS/PS-78/0409; NTIS/PS-77/0374
(NTIS/PS-79/0471/7; NTIS/PS-78/0409; NTIS/PS-77/0374)
Avail: NTIS HC $28.00/MF $28.00 CSCL 01C

Designs and applications of balloons, dirigibles, and airships are investigated in this Government sponsored research. Passenger or cargo transport, timbering, tethering, and fabric selection are discussed. Meteorological balloons are excluded. This updated bibliography contains 250 abstracts, 18 of which are new entries to the previous edition. GRA

N79-30163# National Technical Information Service, Springfield, Va.
LIGHTER THAN AIR VEHICLES. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Apr. 1979
Guy E. Habercom, Jr. May 1979 88 p Supersedes NTIS/PS-78/0410; NTIS/PS-77/0375
(NTIS/PS-79/0472/5; NTIS/PS-78/0410; NTIS/PS-77/0375)
Avail: NTIS HC $28.00/MF $28.00 CSCL 01C

Design and applications of balloons, dirigibles, and airships are investigated. Passenger or cargo transport, timbering, tethering, and fabric selection are discussed. Meteorological balloons are excluded. This updated bibliography contains 82 abstracts, 8 of which are new entries to the previous edition. GRA

N80-18002# Neilsen Engineering and Research, Inc., Mountain View, Calif.
DATA REPORT FOR A TEST PROGRAM TO STUDY TRANSONIC FLOW FIELDS ABOUT WING-BODY/PYLON/STORE COMBINATIONS. VOLUME 2: FLOW FIELD SURVEY DATA FOR CONFIGURATIONS 21 AND 22 Interim Report, 14-23 Feb. 1978

S. S. Stahara and A. J. Crisalli May 1978 247 p
(Contract F44620-75-C-0047; AF Proj. 2307)
(AD-A077183; AFOSR-79-1071TR; NEAR-TR-163-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 20/4

This volume of the data report presentes the flow-field survey data for configurations 21 and 22 at Mach numbers M1 = 0.925, M2 = 0.950, and M3 = 1.05 and angles of attack alpha = 0, 2, and 5 degrees. The data were obtained in the 4T Wind Tunnel at Arnold Engineering and Development Center. These tests, performed at a nominal Reynolds number per foot of 3.0 x 10 to the 6th power are indexed and outlined. GRA

N80-32330*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.
A COMPARISON OF FLIGHT AND SIMULATION DATA FOR THREE AUTOMATIC LANDING SYSTEM CONTROL LAWS FOR THE AUGMENTOR WING JET STOL RESEARCH AIRPLANE
B. Feinreich and G. Gevaert [1980] 18 p refs
(Contract NAS2-10324)
(NASA-CR-152365) Avail: NTIS HC A02/MF A01 CSCL 01A

Automatic flare and decrab control laws for conventional takeoff and landing aircraft were adapted to the unique requirements of the powered lift short takeoff and landing airplane. Three longitudinal autoland control laws were developed. Direct lift and direct drag control were used in the longitudinal axis. A fast time simulation was used for the control law synthesis, with emphasis on stochastic performance prediction and evaluation. Good correlation with flight test results was obtained. S.F.

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also 16 Space Transportation and 85 Urban Technology and Transportation.

A76-40853 **An analysis of U.S. air carrier jet accidents for 1974.** H. A. Sherman (Flight Safety Foundation, Inc., Arlington, Va.), G. P. Jones, and M. Klempa (Southern California, University, Los Angeles, Calif.). In: Managing safety; Proceedings of the Twenty-eighth International Air Safety Seminar, Amsterdam, Netherlands, November 2-6, 1975. Arlington, Va., Flight Safety Foundation, Inc., 1975, p. 21-35.

A number of tables of air carrier jet accidents for 1974 are presented including tables on types of accidents and accident briefs, broad and detailed cause/factor tables, and tables for accident and personnel cause/factor for air carrier jet accidents from 1969 through 1973 vs 1974. A specific analysis carried out on the tables presented has led to the conclusion that 1974 was a year in which the accident profile was very predictable. B.J.

A77-12115 **Concorde maintenance as seen by the designer - The maintenance program (La maintenance de Concorde vue du côté constructeur - Le programme d'entretien).** P. Gavin (La Concorde, Paris, France). *L'Aéronautique et L'Astronautique*, no. 60, 1976, p. 17-33. In French.

Preventive maintenance measures for Concorde are presented and it is pointed out that no special problems occur. Emphasis is laid on routine preventive maintenance procedures. Some modes of maintenance are distinguished, parties directly interested in organization of maintenance (airline, aviation officials, and designers) are indicated, and examples of maintenance documentation are presented. Structural analysis, analysis by zones, and analysis based on aircraft, equipment, and motor systems are contrasted. Organization of the maintenance data bank is sketched. Emergency repair procedures and inspection frequency are discussed briefly. R.D.V.

N75-29082# Systems Consultants, Inc., Falls Church, Va.
STUDY TO DEVELOP REGIONAL AND NATION-WIDE ESTIMATES OF GENERAL AVIATION (GA) ACTIVITY AT NON-TOWERED AIRPORTS Final Report
Pat Hager, Ron Hobbs, Girish Jindia, and Dale Wanderer Feb. 1975 103 p ref
(Contract DOT-FA72WA-2774)
(AD-A009883; SCI-2040-4; FAA-RD-75-43) Avail: NTIS HC $4.75 CSCL 01/3

A standardized statistical method for estimating traffic at nontowered airports through the use of a mathematical model was augmented to reflect general aviation (GA) activity only, and to develop an automated data base sufficient to estimate national and regional GA activity for all nontowered and tow airports in the continental United States. Topics discussed include selection of airports that represent 95% of the annual nationwide GA activity, selection of sample airports for the GA model development, the model development, input data base of GA activity model estimation, and model implementation computer program. Author

N76-14090# Federal Aviation Administration, Washington, D.C.
AIRLINE DELAY TRENDS, 1972-1973. STUDY OF BLOCK TIME DELAYS GROUND AND AIRBORNE FOR SCHEDULED AIR CARRIERS. VOLUME 1: SUMMARY Final Report
Seymour M. Horowitz Jun. 1975 137 p
(AD-A015870/9; FAA-EM-74-11-Vol-1) Avail: NTIS HC $5.75 CSCL 01/2

Estimates of block time delays for the nation's domestic scheduled air carriers operating out of 20 major airports were determined from a data base recently made available by the CAB. This data base provides monthly averages of operational times, both airborne and on the ground, for all route segments receiving scheduled air carrier service, but these data are limited to the 325 route segments connecting with the 20 airports included in this study. Block time delays are those encountered from ramp to ramp on a route segment. Average monthly estimates of the delays for the airborne portion of the segment are provided for a two year period from 1972 to 1973, and are categorized according to (1) route segment, (2) airline, (3) aircraft type, and (4) local scheduled arrival or departure time. Average monthly estimates of the ground portion of the route segment are categorized according to arrival and departure ground times at the 20 specific airport locations connecting the network of routes included in the study. Estimates of arrival and departure ground delays at specific airports are categorized further into Busy and Dull time intervals. Author

N76-30186# Transportation Systems Center, Cambridge, Mass.
SUMMARY OF NATIONAL TRANSPORTATION STATISTICS Final Report, Jan. 1963 - Dec. 1973
William F. Gay Jun. 1976 137 p refs
(PB-252410/6; DOT-TSC-OST-75-18) Avail: NTIS HC $6.00 CSCL 01B

A compendium of selected nation level transportation statistics is reported. Included are cost, inventory, and performance data describing the passenger and cargo operations of the following modes: air carrier, general aviation, automobile, bus, truck, local transit, rail, water, and oil pipeline. Basic descriptors of U.S. transportation, such as operating revenues and expenses, number of vehicles and employees, vehicle miles and passenger miles, etc. are included. GRA

N77-20068# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
THE 1975 GENERAL AVIATION ACTIVITY SURVEY Summary Report
Shung-Chai Huang Sep. 1976 70 p refs
(AD-A032259) Avail: NTIS HC A04/MF A01 CSCL 01/2

The Federal Aviation Administration and the Civil Air Patrol conducted this general aviation activity survey as a joint effort

on August 23 and 26, 1975. The survey produced a comprehensive data base. It is useful in describing general aviation aircraft and pilot profiles, in examining the relationship between aircraft use, ownership, pilot certificate, pilot age and activity and in estimating airport traffic as well as fuel consumption.
Author (GRA)

N77-22084*# California Univ., Berkeley. Inst. of Transportation Studies.
SHORT HAUL AIR PASSENGER DATA SOURCES IN THE UNITED STATES
Joan Al-Kazily, Geoffrey Gosling, and Robert Horonjeff Jun. 1977 174 p refs
(Grant NsG-2127)
(NASA-CR-152871; ITS-SR-76-1) Avail: NTIS HC A08/MF A01 CSCL 01A

The sources and characteristics of existing data on short haul air passenger traffic in the United States domestic air market are described along with data availability, processing, and costs. Reference is made to data derived from aircraft operations since these data can be used to insure that no short haul operators are omitted during the process of assembling passenger data.
Author

N77-29113# National Aviation Facilities Experimental Center, Atlantic City, N. J.
ANALYSIS OF SELECTED GENERAL AVIATION STALL/SPIN ACCIDENTS Final Report, Feb. - Jun. 1976
Jack Shrager Apr. 1977 90 p refs
(FAA Proj. 184-520-100)
(AD-A040824; FAA-NA-77-2; FAA-RD-77-41) Avail: NTIS HC A05/MF A01 CSCL 01/2

An automated data search of existing general aviation data bases was employed in an effort to relate aircraft stall/spin accident history to general design characteristics. The technique utilized a chi square analysis to evaluate a stall/spin history of selected aircraft. The statistical analysis indicated that accident rates are influenced by aircraft usage, and by pilot experience. Low horsepower, low stallspeed aircraft have a higher propensity to stall/spin accidents, the highest incidence being in the takeoff phase of flight.
Author

N78-10028# Transportation Systems Center, Cambridge, Mass.
AIRLINE DELAY TRENDS, 1974-1975. A STUDY OF BLOCK TIME DELAYS, GROUND AND AIRBORNE, FOR SCHEDULED AIR CARRIERS Annual Report
Helen M. Condell, Seymour M. Horowitz, and Alan S. Kaprelian Mar. 1977 218 p
(AD-A039483; TSC-FAA-77-6; FAA-EM-77-2) Avail: NTIS HC A10/MF A01 CSCL 01/2

Estimates of block, airborne and ground delays for route segments flown by United States domestic scheduled airlines operating out of twenty large airports are presented in this document. The data were determined from the CAB ER-586 Service Segment data base, which provides monthly operational times, both ground and airborne, for all route segments receiving scheduled air carrier service. The data in this report are limited to the three-hundred and thirty route segments connecting the twenty airports included in the study. Average monthly estimates of the ground and airborne components of block delays, defined as delays encountered from 'ramp to ramp' on a route segment, are presented for the two-year period from 1974-1975. Average monthly estimates of delays for the airborne portion of the segment 'wheel off' to 'wheels on' are categorized according to 1 Route segment, 2 airline, 3 aircraft type and 4 local scheduled arrival or departure time. Average monthly estimates of delays for the ground portion of the route segments are categorized according to departure and arrival ground times at the twenty airport locations included in the study. These estimates of ground delays are further categorized into 'busy' time intervals 0700 - 2259 and 'dull' time intervals 2300 - 0659.
Author (GRA)

N78-18021# Federal Aviation Administration, Atlantic City, N.J. National Aviation Facilites Experimental Center.
THE ANALYSIS OF NATIONAL TRANSPORTATION SAFETY BOARD LARGE FIXED-WING AIRCRAFT ACCIDENT/INCIDENT REPORTS FOR THE POTENTIAL PRESENCE OF LOW-LEVEL WIND SHEAR Final Report
Jack J. Shrager Dec. 1977 84 p refs
(FAA Proj. 154-451-110)
(AD-A048354; FAA-NA-77-41; FAA-RD-77-169) Avail: NTIS HC A05/MF A01 CSCL 01/2

The National Transportation Safety Board aircraft accident/incident data base covering the years 1964 through 1975 was screened to select those accidents involving aircraft of 12,500 pounds gross weight or greater in which the potential of low level wind shear as a factor could not be discounted. The successive filtering techniques employed eliminated all but 25 of the 59,465 accidents or incidents which comprised the total data base used. The presence of a low level wind shear was a distinct possibility in these 25 takeoff or approach and landing accidents/incidents.
Author

N78-22083# National Aviation Facilities Experimental Center, Atlantic City, N. J.
THE ANALYSIS OF NATIONAL TRANSPORTATION SAFETY BOARD SMALL MULTIENGINE FIXED-WING AIRCRAFT ACCIDENT/INCIDENT REPORTS FOR THE POTENTIAL PRESENCE OF LOW-LEVEL WIND SHEAR Final Report, Jun. - Nov. 1977
Jack J. Shrager Jun. 1978 65 p refs
(FAA Proj. 154-451-110)
(AD-A056780; FAA-NA-78-5; FAA-RD-78-55) Avail: NTIS HC A04/MF A01 CSCL 01/2

The National Transportation Safety Board aircraft accident/incident data base covering the years 1964 through 1975 was screened to select those accidents involving multiengine aircraft of less than 12,500 pounds gross weight in which the potential of low-level wind shear as a factor could not be discounted. The successive filtering techniques employed eliminated all but 27 small multi-engine fixed-wing aircraft accidents/incidents which were approximately similar to the results obtained for the large multiengine aircraft. The presence of a low-level wind shear was a distinct possibility in these 27 takeoff, approach, or landing accidents/incidents. The historical accident information indicates that orographic or local topographic induced wind shears are a more serious problem for this class aircraft than those shears related to thunderstorm and gust front activities.
Author

N79-14081# Transportation Systems Center, Cambridge, Mass.
SUMMARY OF AIRLINE DELAY TRENDS 1972-1976 Final Report
Helen Condell and Seymour R. Horowitz Oct. 1977 82 p
(AD-A050960; TSC-FAA-77-8-F) Avail: NTIS HC A04/MF A01 CSCL 01/2

This document is a highlight edition of the Annual Airline Delay Trends Report published since 1974. These reports provide estimates of block, airborne, and ground delays for approximately 326 route segments connecting 20 of the most active U.S. airports, and serviced by 19 major domestic scheduled air carriers. Delay information as presented in this summary edition consists of airborne and ground data for each of the 20 airports in the study, displayed in both table and graph form, for the years 1972 through 1976 for the following categories: (1) Total traffic activity for route segments arriving at each of the 20 airports by 'busy' and 'dull' time interval ('Busy' 7:00 - 22:59, 'Dull' - 23:00 - 06:59); (2) Average airborne delays for route segments arriving at each of the 20 airports, by 'busy' and 'dull' time intervals; and (3) Average ground times and delays for route segments departing and arriving the 20 airports, by 'busy' and 'dull' time intervals. A table showing the monthly average of airborne arrival delays at a summary airport which represents the total of the 20 study airports is also included.
Author (GRA)

N79-21024*# State Univ. of New York at Albany.
RECOMMENDATIONS OF THE PANELS: PANEL ON FLIGHT PLANNING TO AVOID HIGH OZONE
Volker Mohnen *In* NASA. Lewis Res. Center Ozone Contamination in Aircraft Cabins Mar. 1979 p 7-8

Avail: NTIS HC A05/MF A01 CSCL 06S

Flights planned or accomplished during certain months of the year at the higher latitudes and altitudes at or above the tropopause are discussed. Cabin ozone level limitations are established, and additional information is required for more accurate and qualitative forecasting and design data base for operational utilization. Better tropopause heights, ozone concentration and corresponding meteorological data along selected flight routes, and meteorological data were investigated. S.E.S.

N80-12078# Coast Guard Research and Development Center, Groton, Conn.
ANALYST LEVEL DOCUMENTATION FOR THE SEARCH AND RESCUE SIMULATION (SARSIM) Final Report
G. L. Underwood, J. A. Smith, and G. B. Walters Mar. 1979 85 p refs
(AD-A073155; CGR/DC-14/79; GC-D-49-79) Avail: NTIS HC A05/MF A01 CSCL 09/2

The Search and Rescue Simulation (SARSIM) is a management tool that has been developed to aid Coast Guard decision-makers in developing long-range strategic plans to carry out the SAR mission. SARSIM is a discrete event digital computer simulation program programmed in SIMSCRIPT II.5. It is a highly flexible user-oriented model that simulates Coast Guard response to futuristic caseloads. SARSIM is comprised of three major modules. The first major module is the PREPROCESSOR. The PREPROCESSOR is used to generate expected caseloads based on the historical SAR Data Base. In other words, it supplies a scenario, or futuristic caseload which may, if desired, be used for many different simulation runs. The heart of SARSIM, the SIMULATOR, is essentially a bookkeeping system which logs in cases, registers their needs, investigates the availability of service facilities, assigns resources for servicing, and generally keeps track of simulated time spent in the several possible activities represented within the model and maintains statistics for output. The POSTPROCESSOR is a data retrieval package, which operates on data files from the SIMULATOR to permit a more detailed analysis of simulation runs as a supplement to the printed report from the SIMULATOR. GRA

N80-14082# BioTechnology, Inc., Falls Church, Va.
NAVY COMBAT SEARCH AND RESCUE Final Report
Martin G. Every Sep. 1979 57 p refs
(Contract N00014-77-C-0253)
(AD-A074593) Avail: NTIS HC A04/MF A01 CSCL 06/7

Navy Combat Search and Rescue (SAR) information was collected from aircrewman downed in Southeast Asia, Navy and Air Force records, and Missing and Killed in Action (MIA/KIA) files. This data was analyzed to evaluate the extent and effectiveness of Navy combat SAR, and to determine if indeed it functions as one continuous phase of the aircraft escape-to-rescue process. SAR mission success/loss rates are presented along with a discussion of the key factors which were causal in determining the success or failure of these missions. This report discusses possible alternatives to conventional combat SAR, such as mid-air recovery, and shows how the combat data collected can be used to model some of these alternatives. GRA

N80-17043# National Aviation Facilities Experimental Center, Atlantic City, N. J.
ACCIDENT DATA SYSTEMS STUDY REQUIREMENTS ANALYSIS FOR A FAA ACCIDENT DATA SYSTEM Final Report, Oct. 1977 - Jul. 1979
Ellis V. Couch, Ron M. Hill, T. Kolankiewicz, and Gerald Skelton Aug. 1979 167 p refs
(FAA Proj. 014-100-100)
(AD-A075611; FAA-NA-79-172) Avail: NTIS HC A08/MF A01 CSCL 01/2

The Federal Aviation Administration is investigating possible improvements in its accident data system to enhance aviation safety because the present data system is limited in scope, difficult to use, and of little benefit to aviation safety analysts. The immediate needs which can be met in the near term as well as improvements which will necessitate extensive changes in data collection forms, procedures, and methodologies are analyzed. Other similar data systems are examined, previous related studies are reviewed, and recommendations from users of accident data systems are surveyed. The FAA Flight Standards Service incorporated additional data elements, improved software for better data access, and other near term improvements in the General Aviation Accident Data System now under development. These improvements are evolutionary steps toward the fulfillment of the long range requirements. A.R.H.

N80-18010*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NASA AVIATION SAFETY REPORTING SYSTEM Quarterly Report, 1 Apr. - 30 Jun. 1978
Jun. 1979 54 p refs Prepared in cooperation with Battelle Columbus Labs., Mountain View, Calif.
(NASA-TM-78608; A-7904; QR-9) Avail: NTIS HC A04/MF A01 CSCL 01C

The human factors frequency considered a cause of or contributor to hazardous events onboard air carriers are examined with emphasis on distractions. Safety reports that have been analyzed, processed, and entered into the aviation safety reporting system data base are discussed. A sampling of alert bulletins and responses to them is also presented. J.M.S.

N80-32356# Battelle Columbus Labs., Ohio.
EVALUATION OF SAFETY PROGRAMS WITH RESPECT TO THE CAUSES OF GENERAL AVIATION ACCIDENTS: VOLUME 1: TECHNICAL REPORT
T. M. Connor and C. W. Hamilton May 1980 221 p refs
(Contract DOT-FA78WA-4159)
(AD-A087685; FAA-ASP-80-2-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 01/2

The objective of this study was to determine the extent to which the FAA safety programs were aligned with the causes of general aviation accidents. The data base used in this study consisted of a total of 30,592 general aviation accident records compiled by the National Transportation Safety Board (NTSB) from 1971 through 1977. Analysis of these records was made with respect to NTSB-cited cause/factors. FAA programs implemented during the study time period and pertaining to safety were also included in this study. GRA

N80-33384*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ANALYSIS OF GENERAL AVIATION SINGLE-PILOT IFR INCIDENT DATA OBTAINED FROM THE NASA AVIATION SAFETY REPORTING SYSTEM
Hugh P. Bergeron Oct. 1980 16 p refs
(NASA-TM-80206; L-13548) Avail: NTIS HC A02/MF A01 CSCL 01C

Data obtained from the NASA Aviation Safety Reporting System (ASRS) data base were used to determine problems in general aviation single pilot IFR operations. The data examined consisted of incident reports involving flight safety in the National Aviation System. Only those incidents involving general aviation fixed wing aircraft flying under IFR in instrument meteorological conditions were analyzed. The data were cataloged into one of five major problem areas: (1) controller judgement and response problems; (2) pilot judgement and response problems; (3) air traffic control intrafacility and interfacility conflicts; (4) ATC and pilot communications problems; and (5) IFR-VFR conflicts. The significance of the related problems, and the various underlying elements associated with each are discussed. Previous ASRS reports covering several areas of analysis are reviewed. A.R.H.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

A77-10438 **A systems approach to all weather landings.** L. S. Gephart, W. P. Fuchs (Dayton, University, Dayton, Ohio), G. L. Fileccia, T. Johani (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio), and H. G. Tinsley (FAA, Terminal Navigation Branch, Washington, D.C.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 25-30.

This paper describes the modeling techniques adopted for a reliability/safety analysis of a unique FAA-AFFDL flight test program. The program utilizes a large turbojet aircraft to gain approach and landing experience in Category III weather. The total system includes the ground transmitting system with monitoring, the airborne flight control system (modified and augmented) as used in the automatic landing model with safety pilot and crew 'in the loop', and procedures, both standard and special. The modeling techniques partition the vertical and lateral axes/functions and sub-divide the longitudinal or time axis into contiguous non-overlapping sub-intervals. Analysis techniques, progress and present status are discussed. (Author)

A77-37422 **A change detection and classification system for side-look radar images.** T. P. Truitt, D. T. Bissell, and G. E. Tisdale (Westinghouse Defense and Electronic Systems Center, Baltimore, Md.). In: NAECON '76; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 18-20, 1976. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 533-538.

A change detection method is described for side-look airborne radar images, which is different from the conventional approach in two basic ways. First, pattern recognition techniques are used directly on the mission and reference images to isolate individual objects. Then, a comparison is made between images on an object-by-object basis. Second, the digital processing techniques use a special-purpose preprocessor that extracts key image features and reduces the image bandwidth by up to 100:1 over 6-bit gray levels. B.J.

A77-37457 **Developing satellite-based systems for aviation services.** J. J. Bisaga, J. A. Scardina (FAA, Washington, D.C.), and R. G. Bland (U.S. Department of Transportation, Transportation System Center, Washington, D.C.). In: NAECON '76; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 18-20, 1976. New York, Institute of Electrical and Elertronics Engineers, Inc., 1976, p. 825-832.

This paper briefly discusses the potential role of satellite technology in providing a broad range of aviation services for use in both continental and oceanic airspace. Some of the FAA's activities related to the development of satellite techniques and system concepts are reviewed. A summary of the results obtained to date from the test programs conducted in conjunction with NASA's Application Technology Satellites (ATS) is presented with emphasis given to the recently completed ATS-6 experiments. The AEROSAT program is then described in terms of extending the technology/technique oriented data base begun with the ATS experiments as well as evaluating complete system concepts - in particular candidate oceanic ATC system concepts. Finally, the AEROSAT 'Common System' is defined and its relationship to the process of developing a recommended oceanic system for international consideration is described. (Author)

A79-25323 **FAA remote terminal system frequency assignment model.** C. Cram (FAA, Systems Research and Development Service, Washington, D.C.) and T. Hensler (U.S. Department of Defense, Electromagnetic Compatibility Analysis Center, Annapolis, Md.). In: International Symposium on Electromagnetic Compatibility, Atlanta, Ga., June 20-22, 1978, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 278-281. U.S. Department of Transportation Contract No. FA78WAI-612; Contract No. F19628-78-C-0006. AF Project 649E.

A system of interactive analysis models was developed for the Federal Aviation Administration (FAA) to provide automated, quick-response capabilities for use by FAA frequency managers in solving frequency management problems. This paper describes the frequency assignment model that was developed as part of the FAA's interactive system. The model is used to make VHF (118-135 MHz) Air Traffic Control (ATC) frequency assignments. The criteria used by the model, the operation of the model, and examples of the model's use are discussed in this paper. (Author)

A79-27093 **Future avionics - Keeping capability up, costs down.** B. Walsh. *Military Electronics/Countermeasures*, vol. 5, Feb. 1979, p. 26, 28, 30, 31.

Factors contributing to the rise in avionics costs are discussed, and current and projected Air Force initiatives to reduce acquisition and support costs are reviewed. While new technology offers many benefits, the funds needed to acquire and support new and existing avionics are limited, especially as inflation continues to erode the purchasing power of finite defense dollars. Further, several cycles of technology-enhanced systems create the proliferation problem where a number of earlier generation systems remain in the operational inventory along with the resources needed to support them. The AF Regulation 800-28 (implemented 1978), designed to provide policies and guidelines for lowering avionics costs, includes a detailed treatment of various practical activities, such as the creation of a living data base and definition of required planning processes. A master plan that will include information on how the Air Force plans to develop, acquire, maintain, and modify avionics equipment over the next 15 years is being formulated. A.A.

A80-26819 # **The Federal Aviation Administration navigation program.** N. A. Blake (FAA, Washington, D.C.). In: EASCON '79; Electronics and Aerospace Systems Conference, Arlington, Va., October 9-11, 1979, Conference Record. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 666-672.

The Federal Aviation Administration's navigation program for the next two decades is outlined, which includes the following areas: those associated with certification of navigation systems to meet current requirements and those associated with building a data base to define future system improvements. Attention is given to Loran-C, Omega, and the Helicopter IFR Program, as well as to the cost factors involved in the Global Positioning System. C.F.W.

A80-32001 # **Microwave landing system implementation. Volumes 1 & 2.** Washington, D.C., Radio Technical Commission for Aeronautics, 1977. Vol. 1, 139 p.; vol. 2, 287 p. 93 refs. Price of volume one, $16.; volume two, $24. (DO-166)

The document responds to the terms of reference presented to RTCA Special Committee 125 by providing recommendations for a national microwave landing system (MLS) implementation policy. The recommendations included represent an amalgamation of differing views on how best to make the transition from VHF/UHF to a standard MLS. Three individual strategies (short, middle, and long term) are presented to match the differing objectives of each phase of the total program. Chapter material provides committee-approved material including user recommendations in response to the terms of reference. Appendices are the reports of informal working groups which were assigned responsibility to investigate and report on specific aspects of MLS implementation. V.T.

N76-18098# Systems Technology, Inc., Hawthorne, Calif.
ILS GLIDE SLOPE STANDARDS. PART 2: VALIDATION OF PROPOSED FLIGHT INSPECTION FILTER SYSTEMS AND RESPONSES OF SIMULATED AIRCRAFT ON COUPLED APPROACHES Final Report, 29 Oct. 1974 - 29 Sep. 1975
Lee Gregor Hofmann, John J. Shanahan, and Dunstan Graham Oct. 1975 251 p
(Contract DOT-FA74WA-3340)
(AD-A019295/5; TR-1043-1-2-Pt-2; FAA-RD-74-119-Pt-2)
Avail: NTIS HC $8.00 CSCL 01/2

The data base for validation of the longitudinal approach and landing models was presented. The simulation models include: Convair 880 in combination with the Lear Siegler, Inc. (LSI) Automatic Landing System, an inertially augmented version of the LSI System, or a manual flight director version of the LSI System; and Piper PA-30 with an invented coupler and autothrottle system. Simplified simulation models include an aircraft with perfect pitch attitude and airspeed control and a proportional coupler model and an aircraft with perfect rate-of-climb and airspeed control and a proportional-plus-integral coupler model. The simulation models' responses to 9 prototype Glide Slope faults (steps, sinusoids, and specially configured waveforms) and to actual flight inspection differential trace records for 18 ILS Glide Slope facilities are documented. A total of 54 response records for selected simulation models in response to all Glide Slope inputs, and all simulation models in response to selected Glide Slope inputs are given. Author

N76-22181# Avcon Universal Consultants Corp., Baden, Pa.
PROCESSING INSTRUMENT APPROACH DATA FOR MICROWAVE LANDING SYSTEM IMPLEMENTATION Final Report
Thomas L. Croswell Jun. 1975 67 p refs
(AD-A019762/4; AV-MLS-74-2; FAA-RD-74-182) Avail: NTIS HC $4.50 CSCL 17/7

Computer programs developed for application to microwave landing system implementation planning are described. The data sources, programs and applications, reference documentation for the programs developed, and a training guide and applications manual for these programs are discussed. Author

N76-23190*# Ohio Univ., Athens. Avionics Engineering Center.
SIMULATION ANALYSIS OF A MICROCOMPUTER-BASED, LOW-COST OMEGA NAVIGATION SYSTEM
Robert W. Lilley and Richard J. Salter, Jr. May 1976 10 p refs Presented at Bicentennial Natl. Symp. of the Inst. of Navigation, Warminster, Pa., 28 Apr. 1976
(Grant NGR-36-009-017)
(NASA-CR-147917; TM-26) Avail: NTIS HC $3.50 CSCL 17/7

The current status of research on a proposed micro-computer-based, low-cost Omega Navigation System (ONS) is described. The design approach emphasizes minimum hardware, maximum software, and the use of a low-cost, commercially-available microcomputer. Currently under investigation is the implementation of a low-cost navigation processor and its interface with an omega sensor to complete the hardware-based ONS. Sensor processor functions are simulated to determine how many of the sensor processor functions can be handled by innovative software. An input data base of live Omega ground and flight test data was created. The Omega sensor and microcomputer interface modules used to collect the data are functionally described. Automatic synchronization to the Omega transmission pattern is described as an example of the algorithms developed using this data base. Author

N76-27211# Mitre Corp., McLean, Va.
AUTOMATED IFR TRAFFIC CONTROL: PROJECT OVERVIEW AND OBJECTIVES
R. A. Rucker Nov. 1975 78 p refs
(Contract DOT-FA70WA-2448)
(AD-A020351; MTR-7073; FAA-EM-75-10) Avail: NTIS CSCL 17/7

A digital computer simulation of the automated control of IFR traffic through a realistic replica of an en route arrival sector is described, along with the current plans for improving that model. The simulation is currently capable of automatically planning conflict-free clearances using altitude restrictions and assignments, updating that plan based on flight progress, and issuing the planned clearances at the proper time to assure that minimum separation standards are not violated. The objective is to experimentally develop the technical means for, and the operational and economic implications of, automating the more routine IFR traffic control tasks while assuring that the human controller can retain full cognizance and managerial control of the situation. GRA

N77-18018# Federal Aviation Administration, Washington, D.C.
CENTRAL FLOW CONTROL COMPUTER PROGRAM SPECIFICATIONS. VOLUME 4: DATA BASE SUBSYSTEM SPECIFICATION Final Report
Sep. 1976 75 p
(AD-A031210/8; FAA-RD-76-157-Vol-4; Rept-111-102-Vol-4)
Avail: NTIS HC A04/MF A01 CSCL 17/7

The structure of the data base is defined describing the physical and logical characteristics of the individual files contained in the data base. Data base management functions are specified. This involves the processing, program logic and interfaces required to access the data base for reading and updating the contents, and to accomplish the necessary maintenance functions. Interrelationships between the on-line and the off-line support system in reference to the data base are discussed. Author

N77-22063*# Ohio Univ., Athens. Avionics engineering Center.
A MICROCOMPUTER-BASED LOW-COST OMEGA SENSOR PROCESSOR M.S. Thesis
Richard J. Salter, Jr. Feb. 1977 146 p refs
(Grant NGR-36-009-017)
(NASA-CR-145178; OU-TM-47(NASA)) Avail: NTIS HC A07/MF A01 CSCL 17G

The engineering approach used in the design of a low cost Omega sensor processor is discussed. The processor and its operations are described, as well as the system hardware and software. Circuit details of the hardware modules and program listings for the FORTRAN and microcomputer software are included. Author

N77-24083*# Systems Control, Inc., Palo Alto, Calif.
AN AVIONICS SENSITIVITY STUDY. VOLUME 2: EVALUATION OF AIRBORNE NAVIGATION SYSTEM PERFORMANCE DURING RNAV/MLS TRANSITION Final Report, Aug. 1975 - Sep. 1976
Walter Heine Sep. 1976 115 p refs
(Contract NAS1-14144)
(NASA-CR-145108) Avail: NTIS HC A06/MF A01 CSCL 17G

A computer simulation was modified to generate a suitable data base for performance of an avionics sensitivity study during RNAV/MLS transition. The avionics sensitivity data provides information necessary to establish requirements for additional guidance law design during transition and to establish airspace requirements for maneuvering to null out any residual RNAV errors upon MLS transition. The data base is also beneficial as planning information for subsequent flight testing. Author

N77-27098# National Aviation Facilities Experimental Center, Atlantic City, N. J.
STUDY OF NAVAIDS REMOTE PERFORMANCE CONTROL AND DISPLAY. PROTOTYPE DESIGN AND OPERATIONAL CHARACTERISTICS FOR DATA LOGGING, DISPLAY AND CONTROL OF A NAFEC TEST MODEL (ILS, VOR, TACAN)

Final Report
Morris Ritter, Jack Bernstein, Ronald Polillo, Carmen Munafo, James L. Dottavi, and Matthew Naimo May 1977 55 p
(AD-A039781; FAA-NA-77-33) Avail: NTIS
HC A04/MF A01 CSCL 17/7

A standardized and modularized approach for the remoting of certification type data for multiple NAVAIDS (VOR, TACAN, ILS, etc.) to provide ATF status and control at a central location is presented. Growth potential to encompass other NAVAID types (RCAG, ALS, RVR, Beacon/Radar, etc.) can be incorporated in the proposed system, providing the proper interfaces are accomplished. Author

N77-27087# Lockheed-California Co., Burbank.
THE ROLE OF SIMULATION METHODS IN THE AIRCRAFT CERTIFICATION PROCESS Final Report
Don M. Archibald Mar. 1977 85 p refs
(Contract DOT-FA76WA-3856)
(AD-A039637; FAA-RD-77-17) Avail: NTIS
HC A05/MF A01 CSCL 17/7

The extent to which the use of simulation may be increased during aircraft certification in the future was assessed by surveying recent industry experience and obtaining recommendations relative to the objectives of Advisory Circular 21-14. In addition to the industry assessment, a review of FAR-25 requirements from the economic and technical standpoint was made. Additional simulation in the certification process appears to be both economically attractive and technically feasible, particularly in the area of aircraft systems. The performance demonstrations, currently accomplished by flight testing, is an additional area where simulation may be applied. Author

N78-17039# Analytic Sciences Corp., Reading, Mass.
STANDARDIZATION POTENTIAL ACROSS NAVIGATION SYSTEMS SPANS Final Report, 15 Apr. 1976 - 15 Apr. 1977
Robert K. Gates and Robert F. Shipp 30 Sep. 1977 122 p refs
(Contract F33615-76-C-1121)
(AD-A047937; TASC-TR-840-1; AFAL-TR-77-188) Avail: NTIS HC A06/MF A01 CSCL 17/7

The objective of the SPANS effort is to assess the potential for standardization across avionic navigation systems by identifying standard hardware and software configurations that minimize life-cycle costs while satisfying Air Force operational requirements. The primary output of the effort is a computerized Standardization Evaluation Program (STEP) that quantifies the impact of standardization in those areas of avionics (such as navigation) defined by the program data base. The methodology uses a life-cycle cost model in an iterative manner over a number of aircraft and their associated mission profiles. The life cycle cost model is sensitive to the cost benefits, obtained by widespread use of standard equipment across several aircraft, through cost learning and reliability improvement functions. The SPANS data base consists of three files, including aircraft/mission data, navigation subsystem data and standard cost factors data, that provide the inputs necessary for operation of the STEP program. GRA

N78-24108# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SIMULATION OF SURVEILLANCE AND PROCESSING ALGORITHMS PROPOSED FOR THE DABS MODE OF BCAS
Patricia H. Mann 16 Feb. 1978 66 p ref
(Contracts DOT-FA77WAI-727; F19628-78-C-0002; FAA Proj. 052-241-04)
(AD-A052451; ATC-82; FAA-RD-77-138) Avail: NTIS
HC A04/MF A01 CSCL 17/7

Surveillance Processing Algorithms for the DABS Mode of BCAS were implemented in software for the non-real time processing of air-to-air link data. The data to be processed may be either AMF recorded air-to-air data, or data derived from simulated flight encounters. Examples of simulation trials for a specific collision encounter are presented which illustrate the impact of increased ATCRBS fruit levels upon the performance of the surveillance processor. Detailed definitions of the surveillance processing algorithms are also provided. Author

N79-10041# National Technical Information Service, Springfield, Va.
MICROWAVE LANDING SYSTEMS. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Jun. 1978
William E. Reed Jul. 1978 153 p Supersedes NTIS/PS-77/0617; NTIS/PS-76/0555; NTIS/PS-75/417
(NTIS/PS-78/0731/8; NTIS/PS-77/0617; NTIS/PS-76/0555; NTIS/PS-75/417) Avail: NTIS HC $28.00/MF $28.00 CSCL 17G

Federally-sponsored research on the planning, development, and operation of aircraft microwave landing systems is presented. Studies include feasibility, systems engineering, equipment, signal propagation, and cost analysis. This updated bibliography contains 122 abstracts, 25 of which are new entries to the previous edition. GRA

N79-21034*# Ohio Univ., Athens. Avionics Engineering Center.
LORAN-C FLIGHT DATA BASE
Robert W. Lilley Feb. 1979 12 p refs
(Grant NGR-36-009-017)
(NASA-CR-158380; TM-67) Avail: NTIS HC A02/MF A01 CSCL 17G

Loran-C time-difference data were collected on January 9, 1979 during a flight from Athens, Ohio to Madison VOR in Connecticut, thence to Millville VOR in New Jersey, and a landing at Atlantic City NAFEC. Portions of the return trip to Athens, Ohio were also recorded. Loran-C GRI data frames were recorded using the 9960 U. S. Northeast Loran chain stations Seneca/Nantucket (TDA) and Seneca/Carolina Beach (TDB). The GRI sequence number TDA and TDB were recorded as integer numbers, with the TD's in integer microseconds. Actual time-of-day can be determined from the data start time, plus the time per GRI and the sequence number. The low cost Loran-C receiver was used to obtain the time-difference data for each GRI. Data was recorded on digital magnetic tape and post-processed into latitude and longitude using an IBM system/370 computer. J.A.M.

N79-28183# National Aviation Facilities Experimental Center, Atlantic City, N. J.
PROCEEDINGS OF THE WORLD-WIDE OMEGA DATA BANK CONFERENCE
Apr. 1979 168 p refs Conf. held at Philadelphia, Pa., 2-3 Aug. 1978 Conducted by NAFEC
(AD-A069474; FAA-NA-79-165; ANA-330) Avail: NTIS
HC A08/MF A01 CSCL 17/7

Representatives of U.S. Government regulatory agencies, domestic and foreign avionics industries, and the scheduled and nonscheduled airlines both international and domestic participated in a conference called to: (1) discuss the requirement for and feasibility of establishing an Omega data bank as a depository for data illustrative of Omega propagation; (2) to outline the resources available, general plan of operation and conditions for participation by interested organizations; and (3) to complete plans for operation of this cooperative international venture. The concept, basis of the requirements, and background are explained and the technical presentation, comments, and suggestions about facilitating the deployment of in-flight data recorders, and the retrieval, processing, and analysis, and proposed distribution of data are included. A.R.H.

N79-28189# Army Engineer Topographic Labs., Fort Belvoir, Va.
ANALYSIS, STORAGE, AND RETRIEVAL OF ELEVATION DATA WITH APPLICATIONS TO IMPROVE PENETRATION Research Note
Allen Klinger Mar. 1979 21 p refs
(AD-A068747; ETL-0179) Avail: NTIS HC A02/MF A01 CSCL 17/7

A method to use terrain elevation data for guidance is presented. Tree structure representation of contour trend data over regions is the basis of the method. Regions of different sizes obtained by quartering given elevation metrices are used; region size corresponds to tree position. Two computer functions are discussed: analysis methods to use tree-structured contour-trend information, suitable for onboard inflight computations; and storage reduction methods to present elevation data as a new digital mapping product (tree-structured contour-trend data), computable off-line on the USAETL Computer Sciences Laboratory STARAN array processor. Six figures detailing the analytic and data storage concepts discussed are given. An example illustrating the improved penetration possible from these methods is presented. GRA

N80-23208# Logicon, Inc., San Pedro, Calif.
SOFTWARE IMPACT OF SELECTED EN ROUTE ATC COMPUTER REPLACEMENT STRATEGIES Final Report
W. D. Kandler, D. Weston, and W. B. Cushing Dec. 1979 98 p refs
(Contract DOT-FA78WA-4313)
(AD-A081478; FAA-EM-79-15; Rept-7941-03) Avail: NTIS HC A05/MF A01 CSCL 17/7

The impacts and software constraints associated with transitioning to an en route air traffic control system are examined. The functional splitting of existing major system functions (flight data processing and radar data processing) and the implementation of system enhancements (en route minimum safe altitude warning and flight plan conflict probe) in a new computer system attached to the existing IBM 9020 system via a selector channel are described. The replacement of the IBM 9020 computer with an instruction-compatible computer system is also discussed. The required changes and predicted central processing unit and intersystem channel loading for each functional split are presented and implementation cost estimates provided. M.G.

N80-27310# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Common Avionics Div.
CHARACTERISTIC FOR A MODERATE ACCURACY INERTIAL NAVIGATION SYSTEM (INS)
24 Aug. 1979 380 p Supersedes ASD/ENAC-77-1-Rev-1-Amend-1-3
(AD-A084036; ASD/ENAC-77-1-Rev-2-Amend-1-3; ASD/ENAC-77-1-Rev-1-Amend-1-3) Avail: NTIS HC A16/MF A01 CSCL 17/7

This specification establishes the requirements in terms of form, fit and function (including performance) for an inertial navigation system applicable to a broad spectrum of vehicles. It is the intent of this specification to define the INS requirements to a sufficient extent to allow multiple contractor designed and produced hardware to be used interchangeably at the LRU level in any given vehicle. GRA

N80-27321# General Electric Co., Santa Barbara, Calif.
LORAN-C SIGNAL ANALYSIS Final Report, Aug. 1977 - Dec. 1979
Larry W. Nelson and Burt Gambrill Dec. 1979 105 p refs
(Contract DOT-CG-84810-A)
(AD-A084239; GE79TMP-78; USCG-D-4-80) Avail: NTIS HC A06/MF A01 CSCL 17/7

This report summarizes the results of experimental efforts and theoretical analysis conducted on the Loran-C Signal Analysis project. Experiments to test the stability of the U.S. West Coast Chain, to provide a data base for assessing the predictability of Loran-C signal phase, and to provide data for calibrating San Francisco Harbor are described. Estimates of system error budgets and evaluation of the performance of Loran-C in various operational modes are also described. GRA

N80-30208# Analytic Sciences Corp., Reading, Mass.
DEVELOPMENT OF LORAN-C DATA COLLECTION AND ANALYSIS PROCEDURES Final Report, Dec. 1979 - Feb. 1980
Leon M. DePalma, Edward A. Schoen, and Stephen F. Donnelly Mar. 1980 174 p refs
(Contract DOT-FA79WA-4271)
(AD-A086683; TASC-TR-1021-1; FAA-RD-80-48) Avail: NTIS HC A08/MF A01 CSCL 17/7

A unified data collection and analysis plan to support NAFEC and the FAA in the assessment of Loran-C as either a replacement for or supplement to the current network of VOR/DMEs is presented. This effort focused on four specific areas: Developing mathematical models of temporal variations in Loran-C signal phase and amplitude; Developing data collection procedures to enable an assessment of the accuracy and adequacy of proposed models; Defining a data analysis plan that will enable maximum use of the data collected in identifying parameters of the proposed models and cause and effect relationships of Loran-C temporal variations; and Defining a plan for the design of a data management system for the storage and maintenance of collected data and an efficient interface for the data analysis programs. The plans and models provide the necessary structure for the data collection and analysis effort anticipated to commence early in 1980. Subsequent analysis of the Loran-C data will validate the models and dictate any modifications of the plans. GRA

N80-32372# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
INITIAL DATA BANK REPORT: FALL 1978; WINTER, SPRING, SUMMER, FALL 1979, WINTER 1980 Data Report, 1978 - 1980
Lorraine I. Rzonca Jul. 1980 22 p
(AD-A088204; FAA-CT-80-189; FAA-RD-80-83) Avail: NTIS HC A02/MF A01 CSCL 17/7

The International Bank for airborne Omega data has begun operation at the Federal Aviation Administration (FAA) Technical Center. This first report issued by the Data Bank is based upon preliminary data for Pacific flights in fall 1978 and winter/spring 1979 and upon data from North Atlantic flights in summer/fall 1979 and winter 1980. At least three Omega stations were received during all phases of these flights. No significant seasonal variations or effects due to solar activity were noted in the signal to noise values. These values were highly repeatable (under the same conditions) with major drops due to ice cap attenuation and operation in areas of normally high very low frequency (VLF) noise. Differences in signal to noise between signals traversing daylight/night ice cap (for both Greenland and Antarctica) were noted. GRA

N80-32373# Federal Aviation Administration, Atlantic City, N.J.
SYSTEM DESCRIPTION FOR THE AIRBORNE-OMEGA DATA BANK
Lorraine I. Rzonca Jul. 1980 34 p refs
(AD-A087606; FAA-CT-80-191; FAA-RD-80-84) Avail: NTIS HC A03/MF A01 CSCL 17/7

The Airborne-Omega Data Bank has been established at the Federal Aviation Administration (FAA) Technical Center. Its main objective is to provide a centralized repository for operational airborne-Omega data so that performance which is representative of the majority of production airborne-Omega navigation equipments under various ionospheric conditions (including high solar activity) may be evaluated. Details of the methods developed for data collection, processing, and reporting are documented in this report. Current status and plans for the near future are discussed. GRA

N80-33300# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
PRECISION L-BAND DME TESTS Interim Report, May - Nov. 1978
Harold Postel Aug. 1980 43 p
(FAA Proj. 075-725-210)
(AD-A089053; FAA-CT-80-25; FAA-RD-80-74) Avail: NTIS HC A03/MF A01 CSCL 17/7

This phase of the project was performed under Technical Program Document (TPD) 04-109, subprogram 075-725-210. The report covers the findings on system accuracy and stability of the L-Band Precision Distance Measuring Equipment (PDME). The results showed differences in bias under varying conditions of approaches, orbits, radials, and river runs. The 24 hour overall stability of the system was recorded. Further testing should be performed with simulators that have the desired accuracy required for testing a PDME system so that a baseline can be established. GRA

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information **see also** *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

A76-36222 **A reliability case history - The F-15A Eagle Program.** D. Malvern (McDonnell Aircraft Co., St. Louis, Mo.). *Defense Management Journal*, vol. 12, Apr. 1976, p. 40-45.

It is described how the excellent base of reliability data accumulated during the design of the F-4 Phantom was applied to the reliability design of the F-15A Eagle with 111 separate MTBF guarantees included in the program. Improvements of the F-15A reliability over that of the F-4 were achieved in the following areas: solid state sensors, solid state switching, digital circuits, wiring, simplicity, redundancy, hydraulic systems, dual electric generators and mechanical and electronic control augmentation systems. Over 130,000 avionic test hours and 3,800 flight hours were accumulated for reliability verification of the MTBF guarantees. B.J.

A76-45381 # **More effective aircraft stability and control flight testing through use of system identification technology.** R. A. Burton and D. E. Bischoff (U.S. Naval Air Test Center, Patuxent River, Md.). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Meeting, Dallas, Tex., Sept. 27-29, 1976, Paper 76-894.* 17 p. 12 refs.

The development of system identification technology was undertaken to provide for more effective aircraft flight testing by reducing the time required to conduct specific tests and/or to provide for a more comprehensive data analysis. F-14A and TA-4J flight test results presented demonstrate that the flight time required to obtain stability and control data can be significantly reduced without loss in accuracy of conventional flight test derived parameters. Presentation of S-3A and EA-6B system identification results demonstrate that this technology can be successfully used to update the aerodynamic data bases of modern jet aircraft from flight test data. These system identification results are compared with wind tunnel data and flight test derived paramoters to demonstrate the accuracy of this new technology. Applications of this technology to integrate several areas of aircraft flight testing are discussed. (Author)

A77-38015 **B-1 flight test data logistics for analysis of aircraft performance.** R. E. Little (Rockwell International Corp., Los Angeles, Calif.). In: The many disciplines of flight test; Proceedings of the Seventh Annual Symposium, Eastsound Orcas Island, Wash., August 4-6, 1976. Lancaster, Calif., Society of Flight Test Engineers, 1976, p. 14-1 to 14-21. 5 refs.

This paper presents a detailed review of the flight data processing and analysis methods used to establish the aircraft performance data base for the B-1. Editing and selection of data, processing for data anomalies, and utilization of interactive graphics and remote terminal processing are described. Computation of the elements of airplane performance and the standardization of flight test conditions are presented, with respect to applications of the Uniform Flight Test Analysis System (UFTAS). Sample input/output formats include examples of data visibility and computer interfacing, using simplified 'English' inputs, with hands-on operation of analysis software. (Author)

A77-40086 **Summary of helicopter airframe testing in the shipboard environment.** H. G. Kolwey (U.S. Naval Air Test Center, Patuxent River, Md.). In: American Helicopter Society, Annual National Forum, 33rd, Washington, D.C., May 9-11, 1977, Proceedings. Washington, D.C., American Helicopter Society, Inc., 1977. 9 p. 20 refs. (AHS 77-33-63)

This paper presents a summary of test results from several helicopter shipboard test programs. Data are presented from the HH-2D test on the FF-1052 class USS W.S. Sims in 1970, the SH-2F on the FF-1052 class USS Bowen in 1974, and the HH-3F on the WHEC class USCG Hamilton in 1975. Improvements in NATOPS manual information are highlighted in the areas of wind and/or airspeed limitations, cockpit indications, and helicopter performance information for both level flight and climb and descent. Shipboard deck strength and landing gear capabilities are addressed and a statistical data base is presented from which extrapolations to the 'sea state 5' environment may be made. (Author)

A78-47928 # **The design process.** D. D. Meyer, G. L. Anderton, H. A. Crowell, and J. W. Southall (Boeing Commercial Airplane Co., Seattle, Wash.). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Conference, Los Angeles, Calif., Aug. 21-23, 1978, Paper 78-1483.* 12 p. 5 refs.

The paper describes the results of an effort made to document the design process and extract from it a set of requirements for a computer system that will integrate and manage the design product data, program management information and technical computation and engineering data management activities of the aerospace design process. Design activities were grouped chronologically and explored for activity, interface, data quantity and data flow. Design levels examined included research, preliminary design, detail design, manufacturing, product verification, and product support. (Author)

A80-20826 **Application of RCS guidelines to weight effective aircraft design.** L. A. Irish and M. C. Vincent (Boeing Co., Seattle, Wash.). *Society of Allied Weight Engineers, Annual Conference, 38th, New York, N.Y., May 7-9, 1979, Paper 1270.* 9 p. Contract No. F33615-78-C-3422.

The need for an organized, proven body of trade data and guidelines on the relationship of radar cross section to the familiar aircraft design parameters is emphasized. The approach to developing information consisting of many different activities is examined and some key activities including data base development, parametric study and guideline development are presented. Attention is given to explanations of the relationship between parameters of wing size, sweep, engine inlet and tailsize and radar cross section. C.F.W.

N75-17340# General Dynamics/Convair, San Diego, Calif. Aerospace Div.

WEAPON SYSTEM COSTING METHODOLOGY FOR AIRCRAFT AIRFRAMES AND BASIC STRUCTURES. VOLUME 3: COST DATA BASE Interim Report, Jul. 1972 - May. 1973

R. E. Kenyon Jun. 1974 157 p ref
(Contract F33615-72-C-2083; AF Proj. 1368)
(AD-A000399; CASD-AFS-73-001; AFFDL-TR-73-129-Vol-3)
Avail: NTIS CSCL 01/3

This volume presents the cost data used as the basis for developing the trade cost estimating technique for aerodynamic surfaces. Other data that has become available in the course of the study is also presented. Raw data and organized data are presented. An ultimate objective of the study with respect to the cost data base is to present back-up data for each individual CER, including both trade study and system costing relationships. The cost trend data that is included was produced under an amendment to the contract. Its intent was to provide a data base for cost estimate evaluation. Author (GRA)

N75-18220# Boeing Vertol Co., Philadelphia, Pa.

DOCUMENTING HELICOPTER OPERATIONS FROM AN ENERGY STANDPOINT

S. J. Davis and W. Z. Stepniewski Nov. 1974 127 p refs
(Contract NAS1-13142)

(NASA-CR-132578; D210-10901-1) Avail: NTIS HC $5.75 CSCL 01C

Results are presented of a study of the relative and absolute energy consumption of helicopters, including limited comparisons with fixed-wing aircraft, and selected surface transportation vehicles. Additional comparisons were made to determine the level of reduction in energy consumption expected from the application of advanced technologies to the helicopter design and sizing process. It was found that improvements in helicopter consumption characteristics can be accomplished through the utilization of advanced technology to reduce drag, structures weight, and powerplant fuel consumption. Author

N76-10089*# Aerophysics Research Corp., Bellevue, Wash.
MULTIVARIATE ANALYSIS, RETRIEVAL, AND STORAGE SYSTEM (MARS). VOLUME 1: MARS SYSTEM AND ANALYSIS TECHNIQUES
D. S. Hague, J. D. Vanderberg, and N. W. Woodbury May 1974 68 p refs
(Contract NAS2-7627)
(NASA-CR-137671) Avail: NTIS HC $4.25 CSCL 01C

A method for rapidly examining the probable applicability of weight estimating formulae to a specific aerospace vehicle design is presented. The Multivariate Analysis Retrieval and Storage System (MARS) is comprised of three computer programs which sequentially operate on the weight and geometry characteristics of past aerospace vehicles designs. Weight and geometric characteristics are stored in a set of data bases which are fully computerized. Additional data bases are readily added to the MARS system and/or the existing data bases may be easily expanded to include additional vehicles or vehicle characteristics. Author

N76-10090*# Aerophysics Research Corp., Bellevue, Wash.
MULTIVARIATE ANALYSIS, RETRIEVAL, AND STORAGE SYSTEM (MARS). VOLUME 4: TURBOJET AND TURBOFAN DATA BASE (BY ENGINE)
D. S. Hague, J. D. Vanderburg, and N. W. Woodbury May 1975 32 p
(Contract NAS2-7627)
(NASA-CR-137674) Avail: NTIS HC $3.75 CSCL 01C

A partial listing of turbojet and turbofan engine specifications data, as provided by the MARS (Multivariable Data Analysis, Retrieval, and Storage) system, was given for a number of engines. Author

N76-10091*# Aerophysics Research Corp., Bellevue, Wash.
MULTIVARIATE ANALYSIS, RETRIEVAL, AND STORAGE SYSTEM (MARS). VOLUME 6: MARS SYSTEM; A SAMPLE PROBLEM (GROSS WEIGHT OF SUBSONIC TRANSPORTS)
D. S. Hague and N. W. Woodbury Jul. 1975 31 p refs
(Contract NAS2-7627)
(NASA-CR-137722) Avail: NTIS HC $3.75 CSCL 01C

The MARS system is a tool for rapid prediction of aircraft or engine characteristics based on correlation-regression analysis of past designs stored in the data bases. An example of output obtained from the MARS system, which involves derivation of an expression for gross weight of subsonic transport aircraft in terms of nine independent variables is given. The need is illustrated for careful selection of correlation variables and for continual review of the resulting estimation equations. For Vol. 1, see N76-10089 Author

N76-15148# Institute for Defense Analyses, Arlington, Va. Program Analysis Div.
CHANGES IN HELICOPTER RELIABILITY/MAINTAINABILITY CHARACTERISTICS OVER TIME. VOLUME 1: BASIC REPORT Final Report
Norman J. Asher, John Donelson, and Gerald F. Higgins Mar. 1975 307 p refs 2 Vol.
(Contract DAHC15-73-C-0200)
(AD-A014489; S-451-Vol-1; IDA/HQ-75-17098-Vol-1) Avail: NTIS CSCL 01/3

This two volume report examines the growth (or lack of it) in reliability and maintainability (R and M) characteristics of past helicopter programs and organizes the data so that they can be used as bases for predicting the R and M characteristics of future helicopter programs. Six types of R and M data are presented: (1) failure rates, (2) component-removal rates, (3) mishap rates, (4) maintenance-action rates, (5) operational availability, and (6) maintenance man-hours. Volume one also contains much data on past helicopter programs so that they will be available for use by analysts. GRA

N76-21153# AMC Inventory Research Office, Philadelphia, Pa.
DEMAND FORECASTING WITH PROGRAM FACTORS Final Report
Martin Cohen Sep. 1975 74 p refs
(AD-A017858; IRO-182) Avail: NTIS CSCL 15/5

Empirical demand forecasting studies have raised doubt about the often-made assumption that repair part demand is proportional to end-item usage. The study was made to test this assumption using a data base consisting of demands on the Army Aviation Systems Command National Inventory Point (AVSCOM NICP) for thousands of stocked items. A simulation of the NICP supply function was used to test the assumption and various proposed forecasting algorithms. The criterion was least holding and ordering cost for constant time-weighted requisitions short. The assumption that demand is proportional to end-item program was supported at least for the items responsible for the largest part of the costs, and an improved algorithm was found. GRA

N76-21194# General Dynamics/Convair, San Diego, Calif.
WEAPON SYSTEM COSTING METHODOLOGY FOR AIRCRAFT AIRFRAMES AND BASIC STRUCTURES. VOLUME 1: TECHNICAL VOLUME Final Report, Jul. 1972 - Mar. 1975
R. E. Kenyon Jun. 1975 343 p refs
(Contract F33615-72-C-2083; AF Proj. 1368)
(AD-A016408; AFFDL-TR-75-44-Vol-1) Avail: NTIS CSCL 01/3

This volume provides a detailed description of the function and use of two weapon system costing methodologies for aircraft airframes and basic structures developed for the Air Force Flight Dynamics Laboratory for use in conceptual and preliminary designs phases of weapon system development. The methods are a trade study costing method for detailed cost analysis of trade-offs between weight, cost, type of construction and type of material and a system costing method for determining the projected cost of a complete airframe within the context of a weapon system development. This volume provides a technical discussion of method development. Trade-off capability has been provided for a range of alternative structure and material combinations. A technique for independently assessing complexity factors has been developed and demonstrated. Manufacturing costs are separately estimated for the primary elements of substructure: ribs, spars, covers, leading edges, trailing edges, tips, etc. The trade study method provides an iterative capability stemming from a direct interface with design synthesis programs. A detailed cost data base and system for data expansion is provided. The methods are designed for ease in changing cost estimating relationships and estimating coefficients resulting from cost data update. Author (GRA)

N76-21195# General Dynamics/Convair, San Diego, Calif.
WEAPON SYSTEM COSTING METHODOLOGY FOR AIRCRAFT AIRFRAMES AND BASIC STRUCTURES. VOLUME 2: ESTIMATING HANDBOOK AND USER'S MANUAL, PART 2 Final Report, Jul. 1972 - Feb. 1975
R. E. Kenyon May 1975 371 p refs
(Contract F33615-72-C-2083; AF Proj. 1368)
(AD-A016410; AFFDL-TR-75-44-Vol-2-Pt-2) Avail: NTIS CSCL 01/3

This volume provides a detailed description of the function and use of two weapon system costing methodologies for aircraft airframes and basic structures developed for the Air Force Flight Dynamics Laboratory for use in conceptual and preliminary designs phases of weapon system development. The methods are a trade

study costing method for detailed cost analysis of trade-offs between weight, cost, type of construction and type of material and a system costing method for determining the projected cost of a complete airframe within the context of a weapon system development. This volume provides a technical discussion of method development. Trade-off capability has been provided for a range of alternative structure and material combinations. A technique for independently assessing complexity factors has been developed and demonstrated. Manufacturing costs are separately estimated for the primary elements of substructure: ribs, spars, covers, leading edges, trailing edges, tips, etc. The trade study method provides an iterative capability stemming from a direct interface with design synthesis programs. A detailed cost data base and system for data expansion is provided. The methods ar designed for ease in changing cost estimating relationships a.d estimating coefficients resulting from cost data update.
Author (GRA)

N77-29139*# Operations Research, Inc., Silver Spring, Md.
AVIATION AND PROGRAMMATIC ANALYSES. VOLUME 1, TASK 1: AVIATION DATA BASE DEVELOPMENT AND APPLICATION
28 Mar. 1977 114 p refs 3 Vol
(Contract NAS5-23477)
(NASA-CR-152581) Avail: NTIS HC A06/MF A01 CSCL 01C

A method was developed for using the NASA aviation data base and computer programs in conjunction with the GE management analysis and projection service to perform simple and complex economic analysis for planning, forecasting, and evaluating OAST programs. Capabilities of the system are discussed along with procedures for making basic data tabulations, updates and entries. The system is applied in an agricultural aviation study in order to assess its value for actual utility in the OAST working environment.
A.R.H.

N77-29140*# Operations Research, Inc., Silver Spring, Md.
AVIATION AND PROGRAMMATIC ANALYSES. VOLUME 2, TASK 2: IDENTIFICATION OF PLANNING FACTORS AND ACTIVITIES Final Report
28 Mar. 1977 250 p refs 3 Vol
(Contract NAS5-23477)
(NASA-CR-152582) Avail: NTIS HC A11/MF A01 CSCL 01C

A method was developed for using the NASA aviation data base and computer programs in conjunction with the GE management analysis and projection service to perform simple and complex economic analysis for planning, forecasting, and evaluating OAST programs. Capabilities of the system are discussed along with procedures for making basic data tabulations, updates and entries. The system is applied in an agricultural aviation study in order to assess its value for actual utility in the OAST working environment.
A.R.H.

N77-29141*# Operations Research, Inc., Silver Spring, Md.
AVIATION AND PROGRAMMATIC ANALYSES. VOLUME 3, TASK 3: DEVELOPMENT OF SPECIAL ISSUE PAPERS Final Report
28 Mar. 1977 204 p refs 3 Vol
(Contract NAS5-23477)
(NASA-CR-152583) Avail: NTIS HC A10/MF A01 CSCL 01C

A method was developed for using the NASA aviation data base and computer programs in conjunction with the GE management analysis and projection service to perform simple and complex economic analysis for planning, forecasting, and evaluating OAST programs. Capabilities of the system are discussed along with procedures for making basic data tabulations, updates and entries. The system is applied in an agricultural aviation study in order to assess its value for actual utility in the OAST working environment.
A.R.H.

N77-30113# Naval Ship Research and Development Center, Bethesda, Md. Ship Performance Dept.
SEAKEEPING CHARACTERISTICS OF A PRELIMINARY DESIGN FOR A SEA LOITER AIRCRAFT
Alvin Gersten, Jose Bonilla-Norat, and Lawrence Murray Feb. 1977 137 p refs
(AD-A040062; SPD-748-02) Avail: NTIS HC A07/MF A01 CSCL 01/3

A model of a proposed sea loiter aircraft has undergone experiments in the hullborne model at various headings to regular and random waves. The principal goal of the investigation was to provide data for evaluating the habitability characteristics of this concept. The results will also be used to validate computer predictions. Transfer functions are presented in this report, as are plots and tables of standard deviation values and significant values of vehicle response in a seaway. The effect on motions of varying model weight, and the effectiveness of damping plates in reducing motions are discussed. In general, neither of these is found to significantly alter the unusual transfer functions obtained for this craft. The motions of a buoy, whose configuration was selected to provide wave surface following characteristics, and which was also subjected to waves in the towing tank, are discussed in an appendix.
Author (GRA)

N77-31138# Logistics Management Inst., Washington, D. C.
SENSITIVITY OF ARMY HELICOPTER OPERATING AND SUPPORT COSTS TO CHANGES IN DESIGN AND LOGISTIC PARAMETERS
John D. Forster May 1977 54 p refs
(Contract SD-321)
(AD-A040353; LMI-75-1/4) Avail: NTIS HC A04/MF A01 CSCL 01/3

This study assesses Army helicopter O and S costs and Support Investment (SI) costs in order to assure that the degree of hardware design and logistic parameter sensitivity included in cost estimates accurately reflects actual expenditure sensitivities. Army O and S cost data sources, methodology, and approaches are examined, and selected cost improvements isolated and evaluated. Strengths of the current costing structure are noted so that they can be carried forward and improved upon to assure accurate representation of new systems to the DSARC. O and S data sources reviewed include reliability, maintainability, and field reported cost data. The present methodology and approaches for both Baseline (Program Manager's) Cost Estimates (BCE) and Independent Parametric Cost Estimates (IPCE) are assessed. The dominant O and S costs are found to be Manpower, Replenishment Spares, and Initial Spares. For Manpower and Initial Spares, simplified models are discussed which give OASD visibility into the critical sensitivities of Army helicopter O and S costs. Of the parameters examined for the selected helicopters, O and S costs are most sensitive to the Mean Time Between Dynamic Component Removals (MTBRDC). The report concludes with a discussion of bounding values of Army helicopter O and S cost that can be expected if extreme values of critical O and S cost driving parameters, including those assumed in the cost estimate's approach, are encountered in actual practice.
GRA

N78-12073# Boeing Aerospace Co., Seattle, Wash. Logistics Support and Services.
HISTORICAL ANALYSIS OF C-130E RESOURCES Interim Report, 29 Jun. 1975 - 20 May 1977
Gary A. Brown, Donald E. Griswold, Donald K. Hindes, Gary A. Walker, and David H. Wilson Jul. 1977 251 p refs
(Contract F33615-75-C-0062; AF Proj. 1959)
(AD-A044712; AFHRL-TR-77-48) Avail: NTIS HC A12/MF A01 CSCL 01/3

This report presents the results of the collection and analysis of 15 years of C-130E Historical Resource Utilization data. The purpose of this study was to determine the type, quality and availability of resource utilization data for a specific weapon system. The information collected covers both human and material resource requirements. This type of information provides the baseline for planning for new weapon systems. It also establishes those areas of high utilization which may be reduced in the new system by possibly modifying some design parameter. A major problem encountered in this type of analysis is that the current Air Force management systems are not developed for historical evaluation. Frequently, the critical data are not available or in a form that makes it too costly to obtain. The resulting data bank was developed from existing Air Force data samples. Where only partial data was located, statistical methods were developed and applied to generate the missing data. Analyses were accomplished against seven (7) basic data categories, namely: (a) operations, (b) maintenance, (c) reliability, (d) safety, (e) human resources, (f) material resources, and (g) cost data. All data categories addressed, whenever possible, the 15 year period or life cycle of the C-130E weapon system (1962 through 1976). GRA

N78-13048# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

CORROSION PREDICTABILITY IN F-4 AIRCRAFT ASSIGNED TO THE PACIFIC AIR FORCES M.S. Thesis

Jerrold B. Harrington and Jacob Teomy Jun. 1977 93 p refs
(AD-A045277; AFIT-LSSR-19-77A) Avail: NTIS
HC A05/MF A01 CSCL 01/3

Corrosion has become a serious problem in PACAF due to inadequate management attention in the areas of facilities, training, and manning. The purpose of this study was to construct a mathematical model useful for predicting base-level corrosion control man-hours. The utility of such a model would allow the manager to forecast his requirements for corrosion maintenance. Statistical analysis involved least squares multiple linear regression. Independent variables included: (1) aircraft historical data such as airframe hours, age, assignment history, and MDS; (2) maintenance data such as PDM hours, contract corrosion control hours, and time since last PDM, and (3) corrosion severity indices. Data on the variables used in the analysis were gathered from the AFLC GO-98 computer data bank and at Headquarters PACAF. Studied in this research were F-4 aircraft at four PACAF bases: (1) Kadena AB, Japan; (2) Clark AB, P. I.; (3) Kunsan AB, Korea, and (4) Osan AB, Korea. The results showed a statistically significant regression model, however, a relatively high standard error of the estimate limited its usefulness. Author (GRA)

N78-28084# British Aerospace Aircraft Group, Woodford (England). Manchester Div.

A COMPUTERIZED AIRCRAFT PERFORMANCE SYSTEM

John Richardson *In* AGARD Performance Prediction Methods May 1978 16 p
Avail: NTIS HC A16/MF A01

The system, referred to as CAPS, is a group of computer programs or modules covering the essential elements of performance evaluation and prediction and also the subsequent processing of results. The relationship and interfaces of CAPS with other technical disciplines, for example, aircraft systems, power plant, flight test, and technical publications is discussed and the need to integrate CAPS into the overall design process is emphasized. The use of the system in conjunction with on-line terminals and interactive graphical visual display units is also discussed. P.R.A.

N78-29083# Naval Air Engineering Center, Lakehurst, N.J.

TECHNICAL DATA REQUIREMENTS FOR SHIPBOARD AND SHOREBASED VERTICAL/SHORT TAKEOFF AND LANDING V/STOL AIRCRAFT

W. R. Clarke and F. C. Briggs, Jr. 26 Apr. 1978 68 p Revised
(AD-A054102; NAEC-AWS-571-REV-A) Avail: NTIS
HC A03/MF A01 CSCL 01/3

This document defines the V/STOL aircraft technical data requirements for the Naval Air Systems Command and the Naval Air Engineering Center. The information and data shall cover both shipboard and shorebased operational areas of compatibility. Data submitted provides a central source of information to support the mission assignments with respect to shipboard suitability, ship/aircraft compatibility, aircraft spotting studies, aircraft proposal evaluation, and aviation safety. GRA

N78-31084# Army Aviation Research and Development Command, St. Louis, Mo.

COMPUTERIZED AIRCRAFT ATTRITION PROGRAM Final Report

Ralph O. Tate May 1978 35 p refs
(AD-A055784; USAAVRADCOM-TR-78-9) Avail: NTIS
HC A03/MF A01 CSCL 01/3

The Computerized Aircraft Attrition Program (THAAP) presented in this report provides for a rapid method of calculating the forecasted attrition to be experienced by a given homogenous fleet of aircraft over a specified period of time. The THAAP program is designed to be a time-saving tool which will provide the quantity of aircraft attrited and resultant flying hour program for the adjusted operational fleet. The program will provide for the time-phased induction and withdrawal of aircraft from the fleet over the operational life of the system. The information or output from the program is intended to be used as input to time-phased cost estimates, particularly operating and support cost estimates. The program's output is ideally suited for those studies which are performed manually or by computerized cost models which do not have a fleet attrition capability.
Author (GRA)

N78-33080# Army Material Systems Analysis Activity, Aberdeen Proving Ground, Md.

RELIABILITY, AVAILABILITY AND MAINTAINABILITY ANALYSIS OF THE AQUILA REMOTELY PILOTED VEHICLE SYSTEM

Douglas N. Warrington Jul. 1978 66 p refs
(AD-A056942; AMSAA-IN-R-69) Avail: NTIS
HC A04/MF A01 CSCL 01/3

This report presents an analysis of RAM data obtained during tests conducted at Fort Huachuca, AZ, from July 1977 to November 1977 on the AQUILA Remotely Piloted Vehicle-System Technology Demonstrator. These data were used to estimate the RAM characteristics of the AQUILA RPV system as exhibited during the tests, to provide a RAM data base on an RPV system, to provide a starting point for reliability growth analysis, and to highlight the major failure modes and special RAM problem areas associated with the AQUILA RPV system. Author (GRA)

N78-33081# Army Troop Support and Aviation Material Readiness Command, St. Louis, Mo.

BELL UH-1H RAM/LOG REPORT Final Report, 21 May 1976 - 19 Jun. 1978

Apr. 1978 380 p
(AD-A057231; TSARCOM-TR-78-4) Avail: NTIS
HC A17/MF A01 CSCL 01/3

This RAM/LOG report was generated to establish a comprehensive base line for the UH-1H helicopter and to debug the new RAM/LOG data collection system. The test used 7 aircraft for a total of 1339.4 flight hours over a period of 463 days. Some of the test results are as follows: System MTBR (3.82 hrs) Mission Reliability (.99), Achieved Availability (.95) and total number of parts replaced (455 items). Author (GRA)

N79-23082# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

THE PRODUCTION FUNCTION AND AIRFRAME COST ESTIMATION M.S. Thesis

John A. Long Dec. 1978 75 p refs
(AD-A065570; AFIT/GOR/SM/78D-8) Avail: NTIS
HC A04/MF A01 CSCL 14/1

In recent years, men and governments have become keenly aware of the huge capital outlays necessary in the acquiring of new weapons systems. Increased burden on limited capital has required more complete and careful planning. This planning has led to the need for accurate and timely cost predictions of new systems. Historically, the variables affecting the future cost of aircraft airframes have been proven to be airframe weight and aircraft speed. These are often combined with learning hypothesis to form an airframe cost model. In this paper, the production function of microeconomics is combined with weight, speed, and learning to form a nonlinear cost estimation model. Nonlinear least squares regression analysis was used in evaluating this model. Although the results are inconclusive, based on the data used, weight and speed combined with learning still appear to be the best predictors of aircraft airframe cost. Author (GRA)

N79-20050# Lockheed-California Co., Burbank.
ICING TESTS OF A UH-1H HELICOPTER WITH AN ELECTROTHERMAL ICE PROTECTION SYSTEM UNDER SIMULATED AND NATURAL ICING CONDITIONS Final Report, 31 Jan. - 31 Mar. 1978
R. H. Cotton Apr. 1979 81 p refs
(DA Proj. 1L2-63209-D-103)
(AD-A067737; LR-28667; USARTL-TR-78-48) Avail: NTIS HC A05/MF A01 CSCL 01/3

Natural and simulated icing tests were conducted during February and March 1978 with a UH-1H helicopter equipped with an advanced ice protection system. This was the fourth program of icing tests accomplished with this test aircraft and the second to include natural icing. The objective of this year's program was to expand the icing test envelope, to gather additional data on ice protection system design and performance characteristics, and to obtain specific data for use in a product improvement program for the UH-1 Partial Ice Protection System (Kit A). The testing was conducted at Ottawa, Ontario, Canada. Seven tests in the spray rig and twelve natural icing flights were made totaling 25.8 hours of icing tests. Icing was encountered on seven of the natural icing flights. GRA

N79-27131# Rockwell International Corp., El Segundo, Calif. Los Angeles Div.
AIRCRAFT TRANSPARENCY FAILURE AND LOGISTICAL COST ANALYSIS. VOLUME 1: PROGRAM SUMMARY Final Report, Jun. 1977 - Sep. 1978
S. S. Brown Dec. 1978 67 p refs
(Contract F33615-77-C-3060)
(AD-A068719; NA-78-604-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 01/3

The concern for increasing costs in the maintenance of transparency systems has prompted the Air Force Flight Dynamics Laboratory to sponsor this study contract. The objective of this study is to identify the high-cost, high-maintenance transparency components, identify cause of failures, and recommend corrective programs to reduce cost of ownership to the Air Force Logistics Command. The study involved the review of 20 selected aircraft in current Air Force inventory to establish an extensive data base relating to transparency maintenance activity and associated logistical support costs. During this study, a collection of detailed design characteristics, methods of construction, test and qualification, and costing information was assembled. From these data, the basis for design improvements were determined. The approach used in the identification of candidate improvements was to focus on the high-cost contributors to maintenance and repair. Trade studies were subsequently generated to determine the design improvements that resulted in reduced logistical costs. The study results are presented in this report. GRA

N79-29173# Rockwell International Corp., El Segundo, Calif.
AIRCRAFT TRANSPARENCY FAILURE AND LOGISTICAL COST ANALYSIS. VOLUME 2: DESIGN DATA AND MAINTENANCE PROCEDURES Final Report, Jun. 1977 - Sep. 1978
S. S. Brown Dec. 1978 151 p refs
(Contract F33615-77-C-3060; AF Proj. 2402)
(AD-A068720; NA-78-604-Vol-2; AFFDL-TR-78-153-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 01/3

The aircraft transparency and logistical cost analysis program is aimed at reducing the logistical costs associated with transparency systems for 20 of the current Air Force inventory aircraft. The approach for achieving this goal was to collect all information relating to the physical and performance characteristics, and maintenance historical data of the selected study aircraft. These data provide the means of initiating search for design improvement and cost reduction studies. In order to assess the maintenance and logistical support activity as currently being practical at the Air Logistics Centers and Air Force Operational Bases, both maintenance and installation procedures, as well as qualification and testing procedures, for transparency components and support systems were collected. These data were assembled to determine the support structure level of effort and costs to identify those procedures and practices where cost reduction may be achieved. These data plus the failure analysis conducted in the transparency analysis phases provided the basis for implementing the design improvement and cost reduction studies shown in volume 3. GRA

N79-29174# Rockwell International Corp., El Segundo, Calif.
AIRCRAFT TRANSPARENCY FAILURE AND LOGISTICAL COST ANALYSIS. VOLUME 3: TRANSPARENCY ANALYSIS Final Report, Jun. 1977 - Sep. 1978
S. S. Brown Dec. 1978 215 p refs
(Contract F33615-77-C-3060; AF Proj. 2402)
(AD-A068721; NA-78-604-Vol-3; AFFDL-TR-78-153-Vol-3) Avail: NTIS HC A10/MF A01 CSCL 01/3

The Rockwell Maintenance Analysis Model (MAM) program was used to extract cost data from the K051 LSC system, and maintenance failure modes from the AFM 66-1 maintenance data collection system in order to conduct a detailed logistical cost and failure analysis. The cost and maintenance frequencies were utilized to pinpoint the most productive areas for life cycle cost reduction. A number of potential improvement studies were identified in the initial phase of this program. However, the effort required to research, analyze, and assemble these data, limited the development to five design improvement studies. These factors, coupled with the relative importance of the aircraft in the Air Force inventory, initiated the search for concepts that would cure or substantially reduce the failures identified in the above noted MAM's process. The verification of the feasibility of the proposed changes was accomplished by trading the projected 10-year life cycle cost of the existing concept to the costs of the development, refurbishing, and the reduced maintenance for the revised concept. The five design improvement trade studies resulted in significantly reduced logistical support costs. GRA

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

A78-17410 **Calculation of in-flight thrust and estimation of the uncertainty for turbine powered aircraft.** G. R. Adams and W. E. Rudhman (USAF, Propulsion Performance/Stability Div., Wright-Patterson AFB, Ohio). In: International Instrumentation Symposium, 23rd, Las Vegas, Nev., May 1-5, 1977, Proceedings. Symposium sponsored by the Instrument Society of America. Pittsburgh, Pa., Instrument Society of America (Fundamentals of Aerospace Instrumentation. Volume 9; Fundamentals of Test Measurement. Volume 4), 1977, p. 17-26.

The paper describes a general method for calculating thrust and associated uncertainty by means of a weighted model approach. The method considers the data base available for model correlation, model error determination, and a technique to handle instrumentation accuracies expected in flight test. Results of the analysis of a fighter aircraft powered by an afterburning turbofan engine are presented. Application of the methodology relies heavily on engineering judgment. M.L.

A78-49867 **Application of the General Purpose Multiplex System to the A-7E avionics.** J. L. Jones, J. R. Perkins (Vought Corp., Dallas, Tex.), H. Brown, and E. Kee (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 122-128.

A summary is presented of the results of a study conducted for the Navy which encompassed three primary areas of investigations, development of a signal data base, establishing a General Purpose Multiplex System (GPMS) architecture for fulfilling the A-7E requirements, and determining the impact of applying the GMPS to advanced avionic systems. The data base study defined the A-7E aircraft and avionic subsystem information required to establish the GPMS architecture. Attention is given to the A-7E general purpose multiplex system, the avionics equipment with integral data terminals, multiplexed signals, and advanced aircraft applications. The conclusions from the study are discussed, taking into account protocol, data bus, data rate, the integral data terminal, area multiplex terminals, and control group terminals. G.R.

A78-49987 **Assessment of dynamic coordinate alignment for elastic aircraft.** C. Wakefield (Charles Stark Draper Laboratory, Inc., Cambridge, Mass.). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 1199-1204. Contract No. F33615-77-C-1121. AF Project 7629.

A description is presented of some results for Kalman type filter algorithms that ignore the colored nature of the noise. This implies that the noise is treated as if it were mutually uncorrelated white noise. The data used to drive the filter is synthetically generated angular rates and accelerations that contain appropriate aeroelastic characteristics of a B-52 type aircraft. The effects of various classes of instruments used to sense linear and angular motion are also described. The results presented illustrate the effect of some unmodeled error sources and improvements that can be achieved by simple modeling of specific error terms. As a consequence, certain classes of inertial measurement systems can be eliminated as possible candidate systems regardless of the type of filter employed, adaptive or otherwise. G.R.

A78-50662 # **Correlated data bases for the present and future.** T. W. Hoog (USAF, Aeronautical Systems Div., Wright-Patterson AFB, Ohio). In: Flight Simulation Technologies Conference, Arlington, Tex., September 18-20, 1978, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1978, p. 73-78. (AIAA 78-1583)

An analysis is conducted of the part of the overall simulation problem that deals with topographical data used in the simulation of ground mapping sensors, out the window visual scenes, electronic warfare environments, and navigation aids environments. A solution to the problem of maintaining correlation of these functional areas is proposed which emphasizes correlation of data bases at the source. A demonstration is provided of problems which can arise if the radar, visual, electronic warfare, and navigational aids environments are modeled independently without regard for each other. A representation is given of the data sources used in a typical modern Air Force simulator. G.R.

A79-29734 **Electronic maps for tomorrow's cockpits.** M. Shohat. *Military Electronics/Countermeasures*, vol. 5, Mar. 1979, p. 58, 60, 61.

The newly developed Electronic Terrain Mapping (ETM) system, to be used in future cockpits for such tasks as terrain navigation and avoidance, weapon delivery, sensor correlation, and IFR backup during terminal phases of flight, is discussed. The features distinguishing the ETM from existing avionic systems are considered, noting that the first can provide the pilot with a real-time computer generated scene appearing similar to the actual scene. The Digital Data Base (DDB), comprising the source data for the electronic map, is described, indicating that it represents an ongoing large-scale effort by the Defense Mapping Agency to produce a global digital library of terrain and planimetry/hydrography at several levels of resolution. The objectives of the ETM lab are taken into account, emphasizing the goal of developing a system compatible with the representative access rates obtained with a bubble memory. Parallel work in industry is considered, as is the AFAL's projected acquisition of a brassboard model. A.A.

A80-32437 **Computer data base for 767 avionics interface control.** R. A. Shaw (Boeing Commercial Airplane Co., Seattle, Wash.). In: Challenge of the '80s; Proceedings of the Third Digital Avionics Systems Conference, Fort Worth, Tex., November 6-8, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 129-136.

A new approach is described for producing tabular avionics interface tables. The approach relies on a computerized data base which provides a central source for all interface data. The tabular interface data for each line replaceable unit (LRU) specification is computerized. The computer sorts the data and prints them in a standard format. The data are retained in the computer memory for use in creating overall system tables, checking interfaces between LRUs for consistency, and other applications. If there is an error in the data, it is corrected and a revised set of tables is printed. The key feature of this approach is that there is one source for the data. Implementation of the data base on a minicomputer system is discussed, along with the present state of the data base operation and the future development of the approach. S.D.

N76-18291 **Ministry of Defence, London (England).**
DEVELOPMENT EXPERIENCES OF REAL TIME COMPUTER BASED SYSTEMS IN STRIKE AIRCRAFT
C. J. U. Roberts *In* AGARD Real Time Computer Based Systems Dec. 1974 8 p

This paper will describe the nav/attack system that is fitted to the UK version of the Jaguar aircraft with particular reference to its computing sub-system. The paper will also discuss the effect that the flexibility of digital computing has had on the flight trials program together with some of the salutary experience that has been gained on the inter-relationships of hardware and software and the need for a disciplined validation process for the flight program software. Author

N77-32148# **RAND Corp., Santa Monica, Calif.**
AVIONICS DATA FOR COST ESTIMATING
Bruce E. Armstrong Mar. 1977 20 p Presented at the 1976 DoD Cost Analysis Symp., Airlie, Va., 14-17 Nov. 1976
(AD-A043265; P-5745-1) Avail: NTIS HC A02/MF A01 CSCL 01/3

Avionics cost has been a continuing problem to the defense cost analyst. The various services and the Office of the Secretary of Defense (OSD) have sponsored numerous avionics data collection efforts, as well as funding various companies to develop cost models and cost estimating relationships. To mention a few, both the Air Force and the Navy, and research firms such as General Research Corporation (GRC), Research Management Corporation (RMC), and Institute for Defense Analyses (IDA), have all been involved at one time or another with efforts to develop the avionics cost estimation methods and a supporting data bank. The reason for this level of effort is that the costs of avionics account for nearly 30 percent of the total costs of fighter aircraft and a significant amount in most other aircraft types. Yet, because of rapid technological change, typically small production runs, and poor historical cost information, reliable prediction of avionics costs has been impeded. This paper discusses a recent Rand study sponsored by OSD/Director of Planning and Evaluation (DP and E) which had the objective of creating an avionics data base for tactical aircraft. GRA

N79-17886# **Westinghouse Defense and Electronic Systems Center, Baltimore, Md. Systems Development Div.**
INTEGRATED THERMAL AVIONICS DESIGN (ITAD) Final Report
R. F. Porter,* E. R. Levitt, Y. Lord, R. T. Dolbeare, and R. H. Worsham Jun. 1978 156 p refs
(Contract F33615-77-C-2074)
(AD-A061227; Rept-78-0610; AFFDL-TR-78-76) Avail: NTIS HC A08/MF A01 CSCL 01/3

This volume contains a description of the ITAD study program results. It includes definition of the computer facility requirements and software and shows by example the improvement to be made in Life Cycle cost when ITAD is applied to the design of electronic equipment. Author (GRA)

N79-24080# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
A REVIEW OF THE 3M DATA BASE FOR FAULT-TOLERANT SYSTEM INCENTIVES Final Report, Jul. 1977 - Dec. 1978
Albert L. Hopkins, Jr. Jan. 1979 37 p refs
(Contract N00014-76-C-0502)
(AD-A066697; R-1244) Avail: NTIS HC A03/MF A01 CSCL 17/2

This report covers the second phase of the subject contract, whose first phase was the study of a hierarchical form of a fault-tolerance data communication network. The second phase task involved an examination of the Navy's '3-M' (maintenance material management) data base to see if any evidence was readily available or easily extractable to affirm or refute the hypotheses underlying fault-tolerant system design. A large volume of aggregate data was examined for three aircraft types, the E-2C, the P-3C, and the S-3A. Several broad conclusions were reached with respect to the fault-tolerant system design hypotheses. Some observations and interferences are presented to conclude this report. Author (GRA)

N79-33202# Dynamics Research Corp., Wilmington, Mass.
DIGITAL AVIONICS INFORMATION SYSTEM (DAIS): TRAINING REQUIREMENTS ANALYSIS MODEL (TRAMOD), VOLUME 1 Final Report, Dec. 1977 - May 1978
Andrew J. Czuchry, Kristy M. Doyle, Jonahan T. Frueh, H. Anthony Baran, and Ducan L. Dieterly Apr. 1979 69 p refs
(Contract F33615-75-C-5218)
(AD-A068474; AFHRL-TR-78-58-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 05/9

The training requirements analysis model (TRAMOD) described in this report represents an important portion of the larger effort called the Digital Avionics Information System (DAIS) Life Cycle Cost (LCC) Study. TRAMOD is the second of three models that comprise a LCC impact modeling system for use in the early states of system development. As part of the overall modeling system, the training model is an efficient tool for developing training programs on the basis of task, time, and resource criteria. This report explains the approach used in developing this model and its analytic value as a method for determining training requirements. Also, the methodology used to develop the task-related characteristic data necessary for its application to the DAIS are addressed. The model is described by explaining the techniques and algorithms used to accomplish its function. The interactive nature of TRAMOD affords the user great flexibility in structuring its operation while retaining the capability of addressing specific training problems in depth. This report explains the basis for available options. The Users Guide, Volume II, presents these options and illustrates the manner in which user/model interaction is accomplished. GRA

N80-11083# Arinc Research Corp., Annapolis, Md.
AVIONICS MASTER PLAN DATA BASE MECHANIZATION ARCHITECTURE
J. Maquire and M. Berger Jun. 1979 56 p
(Contract F33657-79-C-0475)
(AD-A071545; PUBL-1743-01-1-1963) Avail: NTIS HC A04/MF A01 CSCL 05/1

This report addressed the development of the architecture for mechanizing the program tracking system used by the Deputy for Avionics Control ASD/AX in the Avionics Master Plan AMP preparation and in the avionics control function. The effort described is to be utilized by the ASD Data Processing facility ADP in its coding and implementation of the AMP data base storage and retrieval program on the DEC PDP 11T60 computer. GRA

N80-20267# Arinc Research Corp., Annapolis, Md.
MECHANIZATION ARCHITECTURE FOR ENHANCEMENT OF AVIONICS PLANNING DATA BASE Final Report
S. Cotton and R. Gilbertson Sep. 1979 170 p
(Contract F33657-79-C-0567)
(AD-A078872; Rept-1760-01-1-2024) Avail: NTIS HC A08/MF A01 CSCL 05/2

This report presents the design of an enhancement to the mechanized version of the Avionics Planning Baseline (APB). For each Air Force aircraft, the APB records the force structure (for a 15-year period), the avionics suite, all present and planned modifications to the avionics suite, all class 4 and class 5 of those modifications, and all ROC/SON/GOR statements dealing with avionics requirements. GRA

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N75-15086*# Aerophysics Research Corp., Hampton, Va.
PREDICTION OF SONIC BOOM FROM EXPERIMENTAL NEAR-FIELD OVERPRESSURE DATA. VOLUME 2: DATA BASE CONSTRUCTION Final Report
C. R. Glatt, S. J. Reiners, and D. S. Hague Washington NASA Feb. 1975 81 p ref
(Contract NAS1-12579)
(NASA-CR-2442) Avail: NTIS HC $4.75 CSCL 20A

A computerized method for storing, updating and augmenting experimentally determined overpressure signatures has been developed. A data base of pressure signatures for a shuttle type vehicle has been stored. The data base has been used for the prediction of sonic boom with the program described in Volume I. Author

N76-29238# Purdue Univ., Lafayette, Ind. School of Aeronautics, Astronautics and Engineering Sciences.
FEASIBILITY STUDY OF INITIAL AIRCRAFT PROPULSION SUBSYSTEM INTEGRATION COST MODEL, PHASE 1, PART 1 Final Report, 9 Sep. - 31 Dec. 1974
John W. Drake, Mostafa R. Reda, and James J. Allen, Jr. Oct. 1975 65 p ref
(Contract F33615-74-C-2014; AF Proj. 3145)
(AD-A021075; AA/ES-74-1-Pt-1; AFAPL-TR-75-88-Pt-1) Avail: NTIS CSCL 21/5

This report describes two methods of estimating the production costs of jet engines not yet built: (1) by building up the costs of the 'cost driving' parts in a traditional Industrial Engineering Fashion and (2) by using regression techniques to estimate either entire engine costs (RAND approach) or parts of engines. The report concludes that both methods are feasible though the former has a greater theoretical accuracy. Potential problems of accounting for changes in performance and schedule may well give the second method the edge in practical application on the bases of cost, speed and speed of implementation. GRA

N77-25171*# Boeing Co., Seattle, Wash.
A METHOD TO ESTIMATE WEIGHT AND DIMENSIONS OF AIRCRAFT GAS TURBINE ENGINES. VOLUME 1: METHOD OF ANALYSIS Final Report
R. J. Pera, E. Onat, G. W. Klees, and E. Tjonneland May 1977 50 p refs
(Contract NAS3-19913)
(NASA-CR-135170; D6-44258-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 21E

Weight and envelope dimensions of aircraft gas turbine engines are estimated within plus or minus 5% to 10% using a computer method based on correlations of component weight and design features of 29 data base engines. Rotating components are estimated by a preliminary design procedure where blade geometry, operating conditions, material properties, shaft speed, hub-tip ratio, etc., are the primary independent variables used. The development and justification of the method selected, the various methods of analysis, the use of the program, and a description of the input/output data are discussed. Author

N78-12084# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

AN ANALYSIS OF INFORMATION SOURCES FOR THE ESTIMATION OF LIFE CYCLE OPERATING AND MAINTENANCE COSTS OF TURBINE ENGINES

Michael D. Baker and Bruce B. Johnston Jun. 1977 170 p refs
(AD-A044082; AFIT-SLSR-11-77A) Avail: NTIS HC A08/MF A01 CSCL 21/5

This study is an attempt to locate, analyze and evaluate data bases which contain operation and support (O and S) cost data for aircraft engines. The search for these data bases was primarily conducted at Headquarters, Air Force Logistics Command. The study focused upon the Increase Reliability of Systems (IROS) data base, the HO36B DOD Cost and Production Report, the AFM 400-1 actuarial data system, the cost and planning factors in AFR 173-10, aerospace ground equipment data located in the Tables of Allowance, and Component Improvement Program data located at the Deputy for Propulsion, Aeronautical Systems Division. The study of these data bases led to the conclusion that data bases in the Air Force are not well designed for cost data collection and that many data bases are necessary to obtain the total operation and support cost of an aircraft engine. Author (GRA)

N78-20079*# National Aeronautics and Space Administration, Washington, D. C.

PROPULSION-AIRFRAME INTERACTIONS PREDICTABILITY

Ronald H. Smith *In* AGARD Performance Prediction Methods May 1978 20 p refs
Avail: NTIS HC A16/MF A01

An illustration of the possible magnitude of the transonic performance prediction problem is shown. These results derived from a careful and systematic set of tests run on a jet effects model, an aerodynamic and force model, and a pressure model, evaluated test techniques and wind tunnel effects. The results were then carefully compared with flight test data where significant discrepancies in zero-lift drag were observed. A vigorous review of the test techniques identified a number of potential error sources. Some of these were thought to be aircraft roughness and protuberances, tunnel anomalies, sting/model support corrections, and hot gas effects. In addition, there were questions on model metric splitline location and magnitude of corrections for scale and Reynolds number. Flight test inlet/engine characteristics were thought to differ, also, from those of the calibration settings in the ground facilities. P.R.A.

N78-29102*# Boeing Aerospace Co., Seattle, Wash.

PROPULSION/FLIGHT CONTROL INTEGRATION TECHNOLOGY (PROFIT) SOFTWARE SYSTEM DEFINITION

Christopher M. Carlin and William J. Hastings Jul. 1978 351 p
(Contract NAS4-2391)
(NASA-CR-144876) Avail: NTIS HC A16/MF A01 CSCL 01C

The Propulsion Flight Control Integration Technology (PROFIT) program is designed to develop a flying testbed dedicated to controls research. The control software for PROFIT is defined. Maximum flexibility, needed for long term use of the flight facility, is achieved through a modular design. The Host program, processes inputs from the telemetry uplink, aircraft central computer, cockpit computer control and plant sensors to form an input data base for use by the control algorithms. The control algorithms, programmed as application modules, process the input data to generate an output data base. The Host program formats the data for output to the telemetry downlink, the cockpit computer control, and the control effectors. Two applications modules are defined - the bill of materials F-100 engine control and the bill of materials F-15 inlet control. L.S.

N78-30133# Vought Corp., Dallas, Tex.

PRODUCTION/COST ANALYSIS OF RAMJET ENGINES, VOLUME 1 Final Technical Report, Apr. 1976 - Jun. 1977

Homer E. Reynolds Dec. 1977 134 p refs
(Contract F33615-76-C-2043)
(AD-A054856; AFAPL-TR-77-50-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 21/5

The subject program was conducted for the purpose of generating cost information on ramjet engines and developing a methodology that could be employed to accurately predict production costs ramjet engines. The methodology addresses many different ramjet types, sizes and production quantities. The methodology determines the cost of individual modules of ramjet assemblies based on similarity of the modules to baseline components that are identified in a cost handbook. (There are typically around 20 basic components of a given ramjet to be costed.) The total cost of the engine is a summation of all the appropriate cost elements. A significant accomplishment of the program was the development of a large cost data base on many different configurations, materials of construction and variations in manufacturing processes. This data base should provide a good foundation on which to build other cost data as it becomes available. GRA

N79-10040*# Boeing Military Airplane Development, Seattle, Wash.

A METHOD TO ESTIMATE WEIGHT AND DIMENSIONS OF LARGE AND SMALL GAS TURBINE ENGINES Final Report

E. Onat and G. W. Klees Jan. 1979 136 p refs
(Contract NA33-21205)
(NASA-CR-159481) Avail: NTIS HC A07/MF A01 CSCL 21E

A computerized method was developed to estimate weight and envelope dimensions of large and small gas turbine engines within + or - 5% to 10%. The method is based on correlations of component weight and design features of 29 data base engines. Rotating components were estimated by a preliminary design procedure which is sensitive to blade geometry, operating conditions, material properties, shaft speed, hub tip ratio, etc. The development and justification of the method selected, and the various methods of analysis are discussed. B.B.

N80-11089# Naval Air Test Center, Patuxent River, Md. Air Vehicle Technology Dept.

SIMULATED MISSION ENDURANCE TEST (SMET) FOR AN AIRCRAFT ENGINE TO BE USED IN A FIGHTER/ATTACK ROLE Final Report

S. M. Cote and J. L. Birkler 23 Apr. 1979 130 p refs
(AD-A071907; NADC-77051-30) Avail: NTIS HC A07/MF A01 CSCL 21/5

A 750 hour simulated mission endurance test (SMET) cycle which will closely represent the expected in-service engine duty cycle for the F18 power plant has been developed. The test cycle evolved from an extensive investigation of Navy and Marine fleet engine operating conditions experienced in fighter and attack aircraft during shorebased and carrier operations. The test cycles reflect power lever movements that are an order of magnitude greater than originally thought, and incorporate a representative distribution of time at intermediate and augmented power. It is concluded that this SMET will aid the overall development process to substantiate the suitability of a new engine for service introduction. GRA

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

A78-46558 * # **Modeling and parameter uncertainties for aircraft flight control system design.** W. W. Rickard (McDonnell Douglas Corp., Long Beach, Calif.). In: Atmospheric Flight Mechanics Conference, Palo Alto, Calif., August 7-9, 1978, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1978, p. 294-303. 10 refs. Contract No. NAS1-14151. (AIAA 78-1371)

As aircraft designs trend toward further applications of control-configured vehicle concepts, aircraft control systems increasingly rely on stability augmentation to obtain normal flying qualities and reasonable structural margins. Although the control system designer would choose to have a perfect dynamic description of the vehicle, he knows that a level of uncertainty of plant dynamics will exist. This paper gives typical values of plant uncertainties for some recent aircraft design and development programs. Histories of pertinent aerodynamic, inertial, and structural parameters from program initiation to aircraft certification are given. These data can be used as typical of future vehicles so that control system design concepts can be evaluated with due consideration to their sensitivity to uncertainties in plant dynamics. (Author)

A80-34998 * # **Multicyclic control of a helicopter rotor considering the influence of vibration, loads, and control motion.** T. J. Brown and J. L. McCloud, III (NASA, Ames Research Center, Moffett Field, Calif.). In: Structures, Structural Dynamics, and Materials Conference, 21st, Seattle, Wash., May 12-14, 1980, Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, Inc., 1980, p. 82-100. 7 refs. (AIAA 80-0673; AHS Paper 80-72)

Weighted multiple linear regression is used to establish a transfer function matrix relationship between higher harmonic control inputs and transducer vibration outputs for a controllable twist rotor. Data used in the regression were taken from the test of a KAMAN controllable twist rotor conducted in the Ames Research Center's 40-by 80-Foot Wind Tunnel in June 1977. Optimal controls to minimize fixed system vibrational levels are calculated using linear quadratic regulatory theory with a control deflection penalty included in the performance criteria. Control sensitivity to changes in control travel, forward speed, and lift and propulsive forces is examined. It is found that the linear transfer matrix is a strong function of forward speed and a weak function of lift and propulsive force. An open-loop strategy is proposed for systems with limited control travel. (Author)

A80-45872 * # **A model-based technique for predicting pilot opinion ratings for large commercial transports.** W. H. Levison (Bolt Beranek and Newman, Inc., Cambridge, Mass.). In: Atmospheric Flight Mechanics Conference, Danvers, Mass., August 11-13, 1980, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1980, p. 166-174. 15 refs. Contract No. NAS1-15529. (AIAA 80-1573)

A model-based technique for predicting pilot opinion ratings is described. Features of this procedure, which is based on the optimal-control model for pilot/vehicle systems, include (1) capability to treat 'unconventional' aircraft dynamics, (2) a relatively free-form pilot model, (3) a simple scalar metric for attentional workload, and (4) a straightforward manner of proceeding from descriptions of the flight task environment and requirements to a prediction of pilot opinion rating. The method is able to provide a good match to a set of pilot opinion ratings obtained in a manned simulation study of large commercial aircraft in landing approach. (Author)

N78-12009*# IBM Federal Systems Div., Houston, Texas.
FLIGHT DESIGN SYSTEM REQUIREMENTS EVALUATION PROGRAM Final Report
R. A. Folk 7 Oct. 1977 18 p refs
(Contract NAS9-14350)
(NASA-CR-151531) Avail: NTIS HC A02/MF A01 CSCL 01C

Flight planning requirements were analyzed and a computer system architecture was defined. An evaluation method of the proposed flight design system is also included. B.B.

N79-22110# Federal Aviation Administration, Washington, D. C. Systems Research and Development Service.
ENGINEERING AND DEVELOPMENT PROGRAM PLAN: ADVANCED INTEGRATED FLIGHT SYSTEMS (AIFS)
May 1978 83 p refs
(AD-A058770; FAA-ED-18-3) Avail: NTIS HC A05/MF A01 CSCL 01/3

It appears that active controls and digital flight control and avionics will significantly impact transport aircraft technology, and therefore, FAA must examine the impact of these advances on airworthiness criteria. To comply with its charged responsibilities, the FAA must stay abreast of technology advancements and establish the necessary safety standards. In the areas of active controls technology and digital flight control and avionics, a technology program entitled Advanced Integrated Flight Systems (AIFS) was established to support this responsibility. L.S.

N79-22102# Air Force Human Resources Lab., Wright-Patterson AFB, Ohio.
MOTION AND FORCE CUEING REQUIREMENTS AND TECHNIQUES FOR ADVANCED TACTICAL AIRCRAFT SIMULATION Final Report, Jul. 1977 - Mar. 1978
William B. Albery, Don R. Gum, and Gerald J. Kron (Singer-Link Co., Binghamton, N. Y.) Brooks AFB, Tex. Dec. 1978 20 p refs
(AD-A064891; AFHRL-TR-78-73) Avail: NTIS HC A02/MF A01 CSCL 01/3

The Air Force Human Resources Laboratory (AFHRL) has the responsibility for research and development of advanced simulation techniques, including motion and force cueing requirements and techniques. This report is a summary of the efforts currently underway at AFHRL under Projects 6114 and 1958 which are directed at advanced tactical aircraft simulation. The approach being pursued is two-fold; the first part includes efforts directed towards building a data base for use in developing cueing requirements; the second part includes efforts to improve the performance of existing devices that have been shown to be somewhat effective and to develop new devices and techniques as indicated by the data base efforts. Exploratory efforts including the development of a composite sensory model, the design of high-g augmentation devices, the development of a myoelectric feedback display dimming technique and the collection of g-cue environment data are discussed. An advanced development effort, the advanced g-cueing system (including g-seat, g-suit, and seat shaker), is highlighted. Author (GRA)

N79-27180# CalspanAdvanced Technology Center, Buffalo, N. Y.
EFFECTS OF CONTROL SYSTEM DYNAMICS ON FIGHTER APPROACH AND LANDING LONGITUDINAL FLYING QUALITIES, VOLUME 1 Interim Report, Jun. 1977 - Mar. 1978
Rogers E. Smith Mar. 1978 232 p refs
(Contract F33615-73-C-3051; AF Proj. 2403)
(AD-A067550; CALSPAN-AK-5280-F-12; AFFDL-TR-78-122-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 01/3

The effects of significant control system dynamics on fighter approach and landing longitudinal flying qualities were investigated in flight using the USAF/Calspan variable stability NT-33 aircraft. Two pilots evaluated 49 different combinations of control system and short period dynamics while performing representative approach and landing tasks. The landing task for the majority of the evaluations included an actual touchdown. Pilot rating and comment data, supported by task performance records, indicate that the landing task, in particular the last 50 ft of the task, is clearly the critical task for aircraft with significant control system lags. For these aircraft, a sharp degradation in flying qualities takes place during this critical phase of the landing task; for example, severe pilot induced oscillations occurred during the landing task but were not in evidence during the approach task. The results provide a data base for the development of suitable flying qualities requirements which are applicable to aircraft with significant control system dynamics; the results show that the present landing approach requirements in MIL-F-8785B (ASG) are not adequate; in particular, they are not applicable to aircraft with complex flight control systems. Author (GRA)

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

A78-49878 # **Transport Canada airfield pavement load evaluation.** L. B. R. Hunter, G. H. Argue, and A. C. Gamble (Canadian Air Transportation Administration, Airports and Construction Services Directorate, Ottawa, Canada). *(American Society of Civil Engineers, Annual Convention, Exposition and Continuing Education Program, San Francisco, Calif., Oct. 17-21, 1977.) ASCE, Transportation Engineering Journal,* vol. 104, Sept. 1978, p. 545-558. 7 refs.

The paper discusses the airfield pavement load evaluation system used by Transport Canada. The evaluation data base consists of construction histories, strength measurements, and structural condition survey reports. The load rating system is based on indexing aircraft loadings and pavement design bearing strengths on a scale of 1-12. Individual written permission is required for overload operations. S.C.S.

A79-15154 **Radar simulation from optical photography.** B. H. Freund (Martin Marietta Aerospace, Orlando, Fla.). In: Electro-Optics/Laser Conference and Exposition, Anaheim, Calif., October 25-27, 1977, Proceedings. Chicago, Industrial and Scientific Conference Management, Inc., 1977, p. 131-141.

Area correlator navigational guidance systems are described, and the production of scene prediction maps is discussed with attention to the use of radar cross-section as the sensed variable. Topics examined include radar prediction maps, reference data base materials, photographic reconnaissance, terrain slope information, reference generation, data base requirements, geometric reconstruction, and feature detection and modification. Each image is digitalized by a precision scanning microdensitometer, and feature detection and modification is performed by a specially configured digital image processing system consisting of a computer with 12 million words of disk storage, a digital coordinagraph, and a high-resolution digital television monitor. M.L.

A79-33458 **New technology S61N simulator.** N. D. Hatfield (Redifon Simulation, Ltd., Crawley, Sussex, England). *Aeronautical Journal,* vol. 83, Mar. 1979, p. 96-100.

A simulator for the Sikorsky S61N has been installed at Dyce Airport, Aberdeen, England, to facilitate training of pilots to fly aircraft used for oil rig work in the North Sea. The basic aspects of the training procedure are described, including preflight, departure, ILS approach, and emergencies on approach and letdown. The simulator is discussed in detail, with emphasis on design features, control feel and AFCS systems, and the Redifon SP1 night/dusk system. The simulated ground stations are considered, noting that station information is stored on a data base. A.A.

A79-38884 **Terrain displays for mission briefing.** R. A. Heartz (General Electric Co., Fairfield, Conn.). In: Annual Simulation Symposium, 11th, Tampa, Fla., March 15-17, 1978, Record of Proceedings. Tampa, Fla., Annual Simulation Symposium; Long Beach, Calif., IEEE Computer Society, 1978, p. 239-252.

Terrain displays derived from digital data bases and generated on color TV monitors may replace the maps, photographs and sketches currently used to brief pilots. Computer-generated imagery can show terrain elevation, terrain relief shading from any direction, slope steepness and direction, hydrography, farmland, forests, buildings and symbology. Displays can be merged, specific themes can be selected from imagery, and a zoom view of any desired area can be produced. In addition to perspective views from any position in the data base, simulated sensor images (radar, far-looking IR or TV) can be generated. Minimum scene update rates and minimum data bases for the terrain displays are discussed. J.M.B.

A80-10768 **The capability of CGI in flight simulation.** T. W. Rowley (Marconi Radar Systems, Ltd., Leicester, England). In: 50 years of flight simulation; Proceedings of the Conference, London, England, April 23-25, 1979. Session 2.
London, Royal Aeronautical Society, 1979, p. 43-50.

CGI flight simulation techniques are examined with reference to the example of the Marconi TEPIGEN (TElevision Picture GENerator). Consideration is given to visuals-to-task matching, constant image density, visual perception, surface information, color, texture, surface shading, modeling languages, instant scenery, and fuzzy objects. B.J.

N76-29132*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
SIMULATION VERIFICATION TECHNIQUES STUDY Final Report
P. B. Schoonmaker and T. H. Wenglinski 31 Mar. 1975 142 p refs
(Contract NAS9-13657)
(NASA-CR-144356; MDC-E-1246) Avail: NTIS HC$5.75 CSCL 14B

Results are summarized of the simulation verification techniques study which consisted of two tasks: to develop techniques for simulator hardware checkout and to develop techniques for simulation performance verification (validation). The hardware verification task involved definition of simulation hardware (hardware units and integrated simulator configurations), survey of current hardware self-test techniques, and definition of hardware and software techniques for checkout of simulator subsystems. The performance verification task included definition of simulation performance parameters (and critical performance parameters), definition of methods for establishing standards of performance (sources of reference data or validation), and definition of methods for validating performance. Both major tasks included definition of verification software and assessment of verification data base impact. An annotated bibliography of all documents generated during this study is provided. Author

N76-10189# Hughes Aircraft Co., Culver City, Calif.
NAVY ATE STUDY: DATA BANK ANALYSIS
Feb. 1974 148 p
(Contract N00123-73-C-1327)
(AD-A009088) Avail: NTIS CSCL 14/2

As a result of the analysis undertaken, it was concluded that there is a need to establish an easily accessible library of automatic test equipment (ATE) for use of all interested personnel, and recommends the establishment of a Navy ATE data bank. There is little doubt such an effective tool can be highly cost effective if enough systems are included. It should be established and operated under mandatory implementing regulations, forcing standardization and ample data distribution. GRA

N76-18153# Avcon Universal Consultants Corp., Baden, Pa.
COMBINING DATA FOR MLS IMPLEMENTATION APPLICATIONS Final Report
T. L. Croswell Jun. 1975 53 p refs
(Contract DOT-PR-WI75-5396-1)
(AD-A018850/8; AV-MLS-75-3; FAA-RD-75-200) Avail: NTIS HC $4.50 CSCL 17/7

Data from the Aiport Master Record system are combined with data previously collected and consolidated from other sources to establish a data base of the necessary historical data to permit projection of microwave landing system (MLS) implementation for individual airports. The present status is described of instrument landing systems and other facilities such as existing runway and approach lights, obstacles, and other general and

specific information describing individual airports, their runways, facilities, and operations. The data sources are briefly discussed and a sample of an application of the combined data is included. The computer programs developed are described along with source language listings of these programs, examples of input and output files, and results of applying these programs to MLS implementation.
Author

N77-27138*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
HIGH REYNOLDS NUMBER RESEARCH
Donald D. Baals, ed. Washington 1977 185 p Workshop Proc. held at Hampton, Va., 27-28 Oct. 1976; sponsored in part by George Washington Univ.
(NASA-CP-2009) Avail: NTIS HC A09/MF A01 CSCL 02A

Fundamental aerodynamic questions for which high Reynolds number experimental capability is required are discussed. The operational characteristics and design features of the National Transonic Facility are reviewed.

N77-27146*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
INSTRUMENTATION AND DATA ACQUISITION SYSTEMS
Joseph F. Guarino *In its* High Reynolds Number Res. 1977 p 81-101 refs
Avail: NTIS HC A09/MF A01 CSCL 14B

A comprehensive and integrated measurement system was identified and a design and development effort initiated to meet the criteria imposed by the National Transonic Facility operating environment. Specific measurement areas receiving concentrated attention include: data acquisition, force measurement, pressure instrumentation, flow visualization techniques, model attitude and model deformation measurement, and temperature measurement. The NTF instrument complex will be centered around four 32-bit, 1-microsecond-cycle-time central processing units connected in a multipoint-distributed network configuration. The principal activities to be supported by these computers are: (1) data base management and processing; (2) research measurement data acquisition and display; (3) tunnel and model control; and (4) process monitoring and communication control. The distributed network approach was chosen to modularize the functional software into definable and implementable parts by the various groups involved in the design and to permit use of similar hardware configurations to improve reliability and maintainability. Author

N78-12108# Air Force Human Resources Lab., Williams AFB, Ariz. Flying Training Div.
PROCEEDINGS OF THE 1977 IMAGE CONFERENCE
May 1977 316 p refs Conf. held at Williams AFB, Ariz., 17-18 May 1977
(AD-A044582) Avail: NTIS HC A14/MF A01 CSCL 14/2

The 1977 Innovative Modeling and Advanced Generation of Environments (IMAGE) Conference is the first conference specifically concerned with the imagery produced by computer generated visual systems relative to flight simulation. The purpose of the conference is to promote an exchange of information and inspire investigations into areas of needed flying training research. With the increasing number of real-time cnmputer generated visual simulators in the field, it is necessary to expand communications among the user organizations and create a forum to present relevant issues. Pertinent topics include but are not limited to: efficient and effective modeling techniques; environmental data base design and structure; psychological determination of visual cue requirements; and software/hardware developments directly resulting in an expansion of image capability and/or utility.
GRA

N79-15801# Air Force Human Resources Lab., Wright-Patterson AFB, Ohio. Advanced Systems Div.
MOTION AND FORCE CUING REQUIREMENTS AND TECHNIQUES FOR ADVANCED TACTICAL AIRCRAFT SIMULATION
William B. Albery, Don R. Gum, and Gerald J. Kron (Singer Co., Binghamton, N.Y.) *In* AGARD Piloted Aircraft Environ. Simulation Tech. Oct. 1978 10 p refs

Avail: NTIS HC A14/MF A01

Data base development efforts which are in process have provided a better understanding of the type of motion and force cuing required for U.S. Air Force tactical aircraft simulators and the type of devices necessary to effectively and efficiently provide this cuing. An advanced g-cuing system was developed which provides both rapid onset and sustained cuing. It is capable of stimulating the important tactile and pressure, as well as nonvestibular proprioceptive, human sensory modalities throughout the frequency spectrum and for the duration of motion and force cuing presented during most tactical flight maneuvers. High-g augmentation devices are investigated and designed which should efficiently provide some of the additional cuing present during extremely high-g flight environments.
S.E.S.

N79-31228# General Electric Co., Daytona Beach, Fla. Ground Systems Dept.
LABORATORY DEVELOPMENT OF COMPUTER GENERATED IMAGE DISPLAYS FOR EVALUATION IN TERRAIN FLIGHT TRAINING Final Report
Roland F. Pester 21 Feb. 1979 22 p refs
(Contract DAHC19-77-C-0006; DA Proj. 2Q7-63743-A-772)
(AD-A070065; ARI-RN-79-8) Avail: NTIS HC A02/MF A01 CSCL 05/9

This report describes the formulation of a digital data base and the equipment utilized to display computer generated images of the resultant terrain scenes. Real time and nonreal time equipment equipment is described. Necessary input data for formulation of digital data bases is delineated. Resulting scene data is to be utilized as stimulus material for evaluation of CGI systems to determine their effectiveness as a medium for training navigators and pilots.
Author (GRA)

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

A77-34560 * **Coronagraphic technique to infer the nature of the Skylab particulate environment.** D. W. Schuerman, D. E. Beeson (New York, State University, Albany, N.Y.), and F. Giovane (U.S. Coast Guard, Research and Development Center, Groton, Conn.). *Applied Optics*, vol. 16, June 1977, p. 1591-1597. 5 refs. Contract No. NAS8-31902.

Photographs taken with the High Altitude Observatory's White Light Coronagraph (Skylab experiment S052) are shown to contain information on the sizes and velocities of contaminant particulates around Skylab. Sizes as small as 5 micron (radius) are derived for particles as far away as 200 m from the spacecraft. The random error in the size derivation is about 30%, and no particle larger than 120 micron was observed. Transverse velocities are determined to within 0.08 m/sec and radial velocities to within 9 m/sec. The S052 data bank contains about 3500 contaminated frames from which the nature of the Skylab environment can be inferred.
(Author)

N75-24777*# Bendix Corp., Ann Arbor, Mich. Aerospace Systems Div.
AUTOMATED SPACE PROCESSING PAYLOADS STUDY. VOLUME 2, BOOK 2: TECHNICAL REPORT, APPENDICES A THROUGH E Final Report
Jan. 1975 123 p
(Contract NAS8-30741)
(NASA-CR-120774; BSR-4171-Vol-2-Bk-2) Avail: NTIS HC $5.25 CSCL 22A

Experiment hardware and operational requirements for space shuttle experiments are discussed along with payload and system concepts. Appendixes are included in which experiment data sheets, chamber environmental control and monitoring, method for collection and storage of electrophoretically-separated samples, preliminary thermal evaluation of electromagnetic levitation facilities L1, L2, and L3, and applicable industrial automation equipment are discussed. M.J.S.

N78-24180*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PAYLOAD OPERATIONS CONTROL CENTER NETWORK (POCCNET) SYSTEMS DEFINITION PHASE STUDY REPORT
Richard DesJardins Jan. 1978 287 p Submitted for publication Prepared in cooperation with Computer Sci. Corp., Los Angeles, Calif., Westinghouse Elec. Corp., Pittsburgh, Pa. and OAO Corp., Beltsville, Md.
(NASA-TM-79567; MOD-6SR/0178) Avail: NTIS HC A13/MF A01 CSCL 22A

The results of the studies performed during the systems definition phase of POCCNET are presented. The concept of POCCNET as a system of standard POCCs is described and an analysis of system requirements is also included. Alternative systems concepts were evaluated as well as various methods for development of reliable reusable software. A number of POCC application areas, such as command management, on board computer support, and simulation were also studied. Other areas of investigation included the operation of POCCNET systems, the facility requirements and usage. Author

N79-30268*# Rockwell International Corp., Downey, Calif. Satellite Systems Div.
SPACE CONSTRUCTION DATA BASE
Jun. 1979 430 p refs
(Contract NAS9-15718)
(NASA-CR-160297; SSD-79-0125) Avail: NTIS HC A19/MF A01 CSCL 22A

Construction of large systems in space is a technology requiring the development of construction methods to deploy, assemble, and fabricate the elements comprising such systems. A construction method is comprised of all essential functions and operations and related support equipment necessary to accomplish a specific construction task in a particular way. The data base objective is to provide to the designers of large space systems a compendium of the various space construction methods which could have application to their projects. G.Y.

N80-13063*# Rockwell International Corp., Canoga Park, Calif.
SPACE CONSTRUCTION SYSTEM ANALYSIS. FINAL REVIEW. PART 1: EXECUTIVE SUMMARY
1979 50 p
(Contract NAS9-15718)
(NASA-CR-160286; PD79-18) Avail: NTIS HC A03/MF A01 CSCL 22A

Several large space system projects which would drive out specific requirements for space construction are considered. A data base was developed to provide designers of large systems with convenient systematic access to methods of space construction and associated requirements. The results obtained were applied to technologies other than the study project. M.M.M.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

No abstracts in this category.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

A76-42288 # **Calibration of the L.A.S. scientific experiments for the D2B scientific satellite (Etalonnage des expériences scientifiques du L.A.S. pour le satellite scientifique D2B).** A. Lieberia, T. Nguyen-Trong, and J. M. Perrin (CNRS, Laboratoire d'Astronomie Spatiale, Marseille, France). In: Technology of scientific space experiments; International Conference, Paris, France, May 26-30, 1975, Reports. Toulouse, Centre National d'Etudes Spatiales, 1975, p. 473-485. 11 refs. In French. Centre National d'Etudes Spatiales Grants No. 69-250; No. 71-679; No. 72-544; No. 73-503; No. 74-501; No. 75-205.

The paper describes the performance of a system installed for calibrating the scientific experiments of L.A.S. After a brief introduction to the calibration method defined by the experimenters and the layout of the minicomputer-controlled equipment, the study examines acquisition, command and control procedures for the real-time measurements. The constitution of a data base, processing methods, and usefulness of DOS (Disc Operating System) management are discussed. The effect of the chosen options on the volume and quality of measurement is evaluated. (Author)

A77-45722 * **An application of the Multi-Purpose System Simulation /MPSS/ model to the Monitor and Control Display System /MACDS/ at the National Aeronautics and Space Administration /NASA/ Goddard Space Flight Center /GSFC/.** F. W. Mill, G. N. Krebs, and E. S. Strauss (Computer Science Corp., Silver Spring, Md.). In: Winter Simulation Conference, 8th, Gaithersburg, Md., December 6-8, 1976, Proceedings. Volume 2.
New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 372-378. Contract No. NAS5-20640.

The Multi-Purpose System Simulator (MPSS) model was used to investigate the current and projected performance of the Monitor and Control Display System (MACDS) at the Goddard Space Flight Center in processing and displaying launch data adequately. MACDS consists of two interconnected mini-computers with associated terminal input and display output equipment and a disk-stored data base. Three configurations of MACDS were evaluated via MPSS and their performances ascertained. First, the current version of MACDS was found inadequate to handle projected launch data loads because of unacceptable data backlogging. Second, the current MACDS hardware with enhanced software was capable of handling two times the anticipated data loads. Third, an up-graded hardware ensemble combined with the enhanced software was capable of handling four times the anticipated data loads. (Author)

A77-48878 **MIDISS - A unique multi-processor telemetry ground station.** D. L. Feinberg (Spacetac, Inc., Bedford, Mass.). In: International Telemetering Conference, Los Angeles, Calif., September 28-30, 1976, Proceedings. Pittsburgh, Pa., Instrument Society of America, 1976, p. 271-280. Navy-supported research.

An optimum architecture for real-time telemetry data acquisition and display has been developed. It provides a high degree of flexibility and throughput while using a minimum of hardware; as applied to the MIDISS system, this approach enables users to specify data processing for each sensor on several satellites independently of downlink formats. Each user can specify and modify CRT displays without interrupting the data processing performance. Processing may include algebraic manipulation, logical branching, logic products, time averaging, etc. This flexibility is provided by SPACE-TALK, a FORTRAN-like language that enables the user to deal with each sensor by name. Users can also format and transmit uplink commands. Hardware minimization is evidenced by MIDISS's compactness. It consists of a 16-bit minicomputer and a SPACEPIPE (microcomputer-based, front-end processor) that decommutates multiple downlinks, provides rate-buffering, and performs data compression and alarm-checking. The minicomputer is thus free to perform extensive data processing for those downlink channels that are changing at significant rates. (Author)

A79-27582 * **Dynamic feature analysis for Voyager at the Image Processing Laboratory.** G. M. Yagi, J. J. Lorre, and P. L. Jepsen (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). In: Conference on Atmospheric Environment of Aerospace Systems and Applied Meteorology, New York, N.Y., November 14-16, 1978, Preprints. Boston, Mass., American Meteorological Society, 1978, p. 110-117. 15 refs. Contract No. NAS7-100.

Voyager 1 and 2 were launched from Cape Kennedy to Jupiter, Saturn, and beyond on September 5, 1977 and August 20, 1977. The role of the Image Processing Laboratory is to provide the Voyager Imaging Team with the necessary support to identify atmospheric features (tiepoints) for Jupiter and Saturn data, and to analyze and display them in a suitable form. This support includes the software needed to acquire and store tiepoints, the hardware needed to interactively display images and tiepoints, and the general image processing environment necessary for decalibration and enhancement of the input images. The objective is an understanding of global circulation in the atmospheres of Jupiter and Saturn. Attention is given to the Voyager imaging subsystem, the Voyager imaging science objectives, hardware, software, display monitors, a dynamic feature study, decalibration, navigation, and data base. G.R.

N76-22232*# Singer Co., Binghamton, N.Y. Simulation Products Div.
SMS DATA BOOK
2 Apr. 1976 27 p
(Contract NAS9-14910)
(NASA-CR-147599; JSC-11012) Avail: NTIS HC $4.00 CSCL 14B

The design data bases for SMS crew stations, instructor/operator station, and station conversion and ancillary are presented. J.M.S.

N77-23146*# Georgia Inst. of Tech., Atlanta. Electric Power Lab.
PROTECTION COORDINATION OF THE KENNEDY SPACE CENTER ELECTRIC DISTRIBUTION NETWORK Summary Report
[1976] 128 p
(Contract NAS10-8375)
(NASA-CR-153052) Avail: NTIS HC A07/MF A01 CSCL 14B

A computer technique is described for visualizing the coordination and protection of any existing system of devices and settings by plotting the tripping characteristics of the involved devices on a common basis. The program determines the optimum settings of a given set of protective devices and configuration in the sense of the best expected coordinated operation of these devices. Subroutines are given for simulating time versus current characteristics of the different relays, circuit breakers, and fuses in the system, coordination index computation, protection checks, plotting, and coordination optimation. Author

N77-23147*# Georgia Inst. of Tech., Atlanta. Electric Power Lab.
VOLTAGE PROFILE PROGRAM FOR THE KENNEDY SPACE CENTER ELECTRIC POWER DISTRIBUTION SYSTEM Summary Report
[1976] 35 p
(Contract NAS10-8375)
(NASA-CR-153053) Avail: NTIS HC A03/MF A01 CSCL 14B

The Kennedy Space Center voltage profile program computes voltages at all busses greater than 1 Kv in the network under various conditions of load. The computation is based upon power flow principles and utilizes a Newton-Raphson iterative load flow algorithm. Power flow conditions throughout the network are also provided. The computer program is designed for both steady state and transient operation. In the steady state mode, automatic tap changing of primary distribution transformers is incorporated. Under transient conditions, such as motor starts etc., it is assumed that tap changing is not accomplished so that transformer secondary voltage is allowed to sag. Author

N78-24241*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SOME DATA RELATIONSHIPS AMONG DIVERSE AREAS OF THE DSN AND JPL
R. M. Smith *In its* The Deep Space Network 15 Apr. 1978 p 280-287 ref
Avail: NTIS HC A14/MF A01 CSCL 22D

A logical level data model was used to represent real world relationships among diverse areas of the Deep Space Network (DSN) and non-DSN areas. The possibility for reduction of data redundancy was addressed. Author

N80-26366*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DEEP SPACE STATION (DSS-13) AUTOMATION DEMONSTRATION
D. S. Remer and G. Lorden (California Inst. of Technology) *In its* The Telecommun. and Data Acquisition Rept. 15 Jun. 1980 p 103-119 refs
Avail: NTIS HC A09/MF A01 CSCL 14B

The data base collected during a six month demonstration of an automated Deep Space Station (DSS 13) run unattended and remotely controlled is summarized. During this period, DSS 13 received spacecraft telemetry data from Voyager, Pioneers 10 and 11, and Helios projects. Corrective and preventive maintenance are reported by subsystem including the traditional subsystems and those subsystems added for the automation demonstration. Operations and maintenance data for a comparable manned Deep Space Station (DSS 11) are also presented for comparison. The data suggests that unattended operations may reduce maintenance manhours in addition to reducing operator manhours. Corrective maintenance for the unmanned station was about one third of the manned station, and preventive maintenance was about one half. M.G.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N77-24182*# Battelle Columbus Labs., Ohio.
PLANNING FOR A DATA BASE SYSTEM TO SUPPORT SATELLITE CONCEPTUAL DESIGN Final Report
Charles R. Claydon Nov. 1976 120 p
(Contract NASw-2800)
(NASA-CR-153008; BCL-OA-TFR-76-11) Avail: NTIS HC A06/MF A01 CSCL 22A

The conceptual design of an automated satellite design data base system is presented. The satellite catalog in the system includes data for all earth orbital satellites funded to the hardware stage for launch between 1970 and 1980, and provides a concise compilation of satellite capabilities and design parameters. The cost of satellite subsystems and components will be added to the base. Data elements are listed and discussed. Sensor and science and applications opportunities catalogs will be included in the data system. Capabilities of the BASIS storage, retrieval, and analysis system are used in the system design. Author

N77-27188*# Lockheed Electronics Co., Houston, Tex.
THE STATUS OF ENVIRONMENTAL SATELLITES AND

AVAILABILITY OF THEIR DATA PRODUCTS
C. L. Hughes and C. E. Campbell Mar. 1977 152 p refs
(Contract NAS9-15200)
(NASA-CR-151459; JSC-12706; LEC-10344) Avail: NTIS
HC A08/MF A01 CSCL 22B

The latest available information about the status of unclassified environmental satellite (flown by the United States) and their data products is presented. The type of environmental satellites discussed include unmanned earth resource and meteorological satellites, and manned satellites which can act as a combination platform for instruments. The capabilities and data products of projected satellites are discussed along with those of currently operating systems. Author

N77-22040# Boston Coll., Chestnut Hill, Mass. Space Data Analysis Lab.
DATA PROCESSING FOR THE S3 SATELLITES Technical Report, 1 Feb. 1970 - 31 Jan. 1977
Dennis E. Delorey 30 Apr. 1977 94 p
(Contract F19628-76-C-0190)
(AD-A041812; BC-SDAL-77-3) Avail: NTIS
HC A05/MF A01 CSCL 09/2

Data processing systems were developed and are being implemented for the S3-1, S3-2 and S3-3 satellites. Data flow through the systems is described and the program interfaces defined. Processing requirements for the probes flown aboard the S3-2 vehicle are detailed. Data bases created at all phases of the system are defined. Spacecraft telemetry and operational modes are outlined. Author (GRA)

N78-17132# Air Force Weapons Lab., Kirtland AFB, N. Mex.
LAUNCH: A COMPUTER CODE FOR DETERMINING LAUNCH VEHICLE RELIABILITY Final Report
Marcia A. Thornton Sep. 1977 81 p refs
(AD-A047384; AD-E200042; AFWL-TR-77-126) Avail: NTIS
MF A01 CSCL 22/4

The computer code, LAUNCH, is designed to maintain a data file on the launches of major launch vehicles. From this data file one can obtain a chronological history of any desired vehicle or group of vehicles as well as the historical reliability and/or projected reliability for any future launch. A discussion of the code and its applications are included along with a listing of the program and a sample output results. Author (GRA)

N78-30189*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CATALOG OF VIKING MISSION DATA
Robert W. Vostreys, ed. May 1978 41 p
(NASA-TM-79397; NSSDC/WDC-A-R/S-78-01) Avail: NTIS
HC A03/MF A01 CSCL 22A

This catalog announces the present/expected availability of scientific data acquired by the Viking missions and contains descriptions of the Viking spacecraft, experiments, and data sets. An index is included listing the team leaders and team members for the experiments. Information on NSSDC facilities and ordering procedures, and a list of acronyms and abbreviations are included in the appendices. A.R.H.

N79-14147# Boston Coll., Chestnut Hill, Mass. Space Data Analysis Lab.
DATA BASE DEVELOPMENT FOR AIR FORCE SATELLITES
Dennis E. Delorey 31 Mar. 1978 72 p Prepared for AFGL
(Contract F19628-76-C-0190) •
(AD-A060044; BC-SDAL-78-1; AFGL-TR-78-0076; SR-2) Avail: NTIS HC A04/MF A01 CSCL 09/2

Data bases have been created for the S3-1 satellite and are being created for satellite S3-2. The data processing system developed for these vehicles, the payloads aboard the spacecrafts and the computer software associated with the data processing system are described. Creation and application of the history file for satellite S3-1 are also described. An overview of the SCATHA satellite project is also included. Author (GRA)

N79-18071*# Rockwell International Corp., Downey, Calif. Satellite Systems Div.
SATELLITE POWER SYSTEM (SPS) CONCEPT DEFINITION STUDY (EXHIBIT C) Final Review
G. M. Hanley 21 Mar. 1979 477 p refs
(Contract NAS8-32475)
(NASA-CR-161173; SSD-79-0076) Avail: NTIS
HC A21/MF A01 CSCL 22B

The major outputs of the study are the constructability studies which resulted in the definition of the concepts for satellite, rectenna, and satellite construction base construction. Transportation analyses resulted in definition of heavy-lift launch vehicle, electric orbit transfer vehicle, personnel orbit transfer vehicle, and intra-orbit transfer vehicle as well as overall operations related to transportation systems. The experiment/verification program definition resulted in the definition of elements for the Ground-Based Experimental Research and Key Technology plans. These studies also resulted in conceptual approaches for early space technology verification. The cost analysis defined the overall program and cost data for all program elements and phases. G.Y.

N79-20140*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE NIMBUS 7 SPACECRAFT SYSTEM
In its The Nimbus 7 User's Guide Aug. 1978 p 1-18

Avail: NTIS HC A14/MF A01 CSCL 22A

The Nimbus mission objectives, the scientific objectives of the Nimbus 7 experiments are presented. The component subsystems and experiments of the spacecraft are described. Information on data products and their availability are provided. S.E.S.

N79-27227# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.
WEAPON DELIVERY AND ITS EVALUATION
P. Manville *In* AGARD Guidance and Control for Tactical Weapons with Emphasis on Simulation and Testing May 1979 23 p refs
Avail: NTIS HC A07/MF A01

The influences and constraints that govern the delivery of tactical air to ground guided weapons are reviewed. The need to consider the total weapon system delivery performance in the context of the real scenario is reported. The distinct roles of modelling, man-in-the-loop simulation, and flight demonstration are discussed. A sound technical choice to be made between alternative options is achieved. S.E.S.

N79-31280*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LAUNCH SUMMARY FOR 1978
Robert W. Vostreys Aug. 1978 42 p refs Revised
(NASA-TM-80503; NSSDC/WDC-A-R/S-79-04) Avail: NTIS
HC A03/MF A01 CSCL 22A

Sounding rocket, satellite, and space probe launchings are presented. Time, date, and location of the launches are provided. The sponsoring countries and the institutions responsible for the launch are listed. A.W.H.

N80-26362# Syracuse Univ., N. Y.
GEOMETRY OF ORBITING EARTH SATELLITES (GOES) Final Technical Report, Jan. 1978 - Jul. 1979
Jeffrey L. Posdamer Jan. 1980 69 p refs
(Contract F30602-75-C-0121; AF Proj. 0172)
(AD-A082381; RADC-TR-79-357) Avail: NTIS
HC A04/MF A01 CSCL 17/8

This report describes the results of a study undertaken to determine if apparent satellite brightness as measured at Earth tracking stations could be used to determine the geometry of the specular reflectors on the orbiting Earth satellite. Specular peaks were identified in the data, sequences of peaks were traced, the maximum peak was identified, and the area and orientation of the maximum peaks were calculated. The output of the specular detection process can be interactively edited to allow translation and rotation of the polygons generated. The process cannot provide unique solutions to the reconstruction problem without some prior knowledge of the object's surface geometry, however. While the feasibility of this approach has been demonstrated, additional work in the areas of simulation, signal processing, and pattern recognition is required. GRA

N80-25404# RAND Corp., Santa Monica, Calif.
A PRELIMINARY ANALYSIS OF THE EFFECT OF WORK-AROUNDS ON SPACE SYSTEM PERFORMANCE AND PROCUREMENT REQUIREMENT: A PROPOSAL Interim Report
Gary Parish and William Sollfrey Mar. 1980 33 p
(Contract F49620-77-C-0023)
(AD-A085644; RAND/N-1280-AF) Avail: NTIS HC A03/MF A01 CSCL 22/2

This note identifies a factor that appears to have been neglected in explaining the discrepancy between predicted and observed satellite lifetimes in orbit. This factor--extension of satellite life through ingenious 'work-around' corrections--is not represented in current satellite replenishment models. The note explores the effect of this omission on various measures of system performance, develops an analytical method of incorporating these work-arounds in replenishment models, and derives an initial estimate of the required parameters from a convenient data base. Incorporating the effect of work-arounds dramatically improves system performance and lowers procurement requirements. GRA

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also 03 Air Transportation and Safety and 85 Urban Technology and Transportation.

A79-34709*# **AVID - A design system for technology studies of advanced transportation concepts.** A. W. Wilhite and J. J. Rehder (NASA, Langley Research Center, Vehicle Analysis Branch, Hampton, Va.). In: Conference on Advanced Technology for Future Space Systems, Hampton, Va., May 8-10, 1979, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1979, p. 64-70. 15 refs. (AIAA 79-0872)

The basic AVID (Aerospace Vehicle Interactive Design) is a general system for conceptual and preliminary design currently being applied to a broad range of future space transportation and spacecraft vehicle concepts. AVID hardware includes a minicomputer allowing rapid designer interaction. AVID software includes (1) an executive program and communication data base which provide the automated capability to couple individual programs, either individually in an interactive mode or chained together in an automatic sequence mode; and (2) the individual technology and utility programs which provide analysis capability in areas such as graphics, aerodynamics, propulsion, flight performance, weights, sizing, and costs. B.J.

N78-21246*# Martin Marietta Corp., Denver, Colo.
SPACE TUG DOCKING STUDY. VOLUME 2: STUDY RESULTS Final Report
Mar. 1976 147 p refs 5 Vol
(Contract NAS8-31542)
(NASA-CR-144240; MCR-76-3-Vol-2) Avail: NTIS HC $6.00 CSCL 22B

Results of a detailed systems analysis of the entire rendezvous and docking operation to be performed by the all-up space tug are presented. Specific areas investigated include: generating of operational requirements and a data base of candidate operational techniques and subsystem mechanizations; selection and ranking of integrated system designs capable of meeting the requirements generated; and definition of the simulation/demonstration program required to select and prove the most effective manual, autonomous, and hybrid rendezvous and docking systems. J.M.S.

N78-21247*# Martin Marietta Corp., Denver, Colo.
SPACE TUG DOCKING STUDY. VOLUME 3: PROCEDURES AND PLANS Final Report
Mar. 1976 232 p 5 Vol
(Contract NAS8-31542)
(NASA-CR-144241; MCR-76-3-Vol-3) Avail: NTIS HC $8.00 CSCL 22B

Results of a detailed systems analysis of the entire rendezvous and docking operation to be performed by the all-up space tug are presented. Specific areas investigated include: generating of operational requirements and a data base of candidate operational techniques and subsystem mechanizations; selection and ranking of integrated system designs capable of meeting the requirements generated; and definition of the simulation/demonstration program required to select and prove the most effective manual, autonomous, and hybrid rendezvous and docking systems. J.M.S.

N78-21248*# Martin Marietta Corp., Denver, Colo.
SPACE TUG DOCKING STUDY. VOLUME 4: SUPPORTING ANALYSES Final Report
Mar. 1976 262 p refs 5 Vol
(Contract NAS8-31542)
(NASA-CR-144242; MCR-76-3-Vol-4) Avail: NTIS HC $9.00 CSCL 22B

Results of a detailed systems analysis of the entire rendezvous and docking operation to be performed by the all-up space tug are presented. Specific areas investigated include: generating of operational requirements and a data base of candidate operational techniques and subsystem mechanizations; selection and ranking of integrated system designs capable of meeting the requirements generated; and definition of the simulation/demonstration program required to select and prove the most effective manual, autonomous, and hybrid rendezvous and docking systems. J.M.S.

N78-21249*# Martin Marietta Corp., Denver, Colo.
SPACE TUG DOCKING STUDY. VOLUME 5: COST ANALYSIS Final Report
Mar. 1976 40 p 5 Vol
(Contract NAS8-31542)
(NASA-CR-144243; MCR-76-3-Vol-5) Avail: NTIS HC $4.00 CSCL 22B

The cost methodology, summary cost data, resulting cost estimates by Work Breakdown Structure (WBS), technical characteristics data, program funding schedules and the WBS for the costing are discussed. Cost estimates for two tasks of the study are reported. The first, developed cost estimates for design, development, test and evaluation (DDT&E) and theoretical first unit (TFU) at the component level (Level 7) for all items reported in the data base. Task B developed total subsystem DDT&E costs and funding schedules for the three candidate Rendezvous and Docking Systems: manual, autonomous, and hybrid. Author

N78-30262*# Aerospace Corp., El Segundo, Calif.
STS USERS STUDY (STUDY 2.2). VOLUME 1: EXECUTIVE SUMMARY Final Report
Ernest I. Pritchard 1 Nov. 1975 28 p refs
(Contract NASw-2727)
(NASA-CR-148720; ATR-76(7362)-1-Vol-1) Avail: NTIS HC $4.00 CSCL 22B

The space transportation system (STS) and ancillary equipment user studies are presented. Space shuttle data and planning requirements needed by the STS user are discussed along with the potential for common usage of multi-mission support equipment by the military and other aerospace personnel. B.B.

N77-13118*# TRW Defense and Space Systems Group, Houston, Tex. Systems Analysis Section.
FORMULATION OF DETAILED CONSUMABLES MANAGEMENT MODELS FOR THE DEVELOPMENT (PREOPERATIONAL) PERIOD OF ADVANCED SPACE TRANSPORTATION SYSTEM: EXECUTIVE SUMMARY
J. G. Torian Nov. 1976 30 p refs
(Contract NAS9-14284)
(NASA-CR-151115; TRW-26821-H001-R0-00) Avail: NTIS HC A03/MF A01 CSCL 22A

Formulation of models required for the mission planning and scheduling function and establishment of the relation of those models to prelaunch, onboard, ground support, and postmission functions for the development phase of space transportation systems (STS) was conducted. The preoperational space shuttle is used as the design baseline for the subject model formulations. Analytical models were developed which consist of a mission planning processor with appropriate consumables data base and a method of recognizing potential constraint violations in both the planning and flight operations functions. A flight data file for storage/retrieval of information over an extended period which interfaces with a flight operations processor for monitoring of the actual flights was examined. Author

N77-13120*# TRW Defense and Space Systems Group, Houston, Tex. Systems Analysis Section.
FORMULATION OF DETAILED CONSUMABLES MANAGEMENT MODELS FOR THE DEVELOPMENT (PREOPERATIONAL) PERIOD OF ADVANCED SPACE TRANSPORTATION SYSTEM. VOLUME 2: CONSUMABLES DATA BASE WORKBOOK
M. A. Zamora Nov. 1976 130 p refs
(Contract NAS9-14284)
(NASA-CR-151117; TRW-26821-H003-R0-00-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 22A

The consumables characteristic data associated with the performance of the mission activities required by the mission planning processor are defined to calculate the consumables requirements. The activity data is defined in terms of discrete time periods having a distinct rate for each consumable required to support the performance of a given operation. The data is structured in a series of consumable data worksheets for each activity that includes a profile of its operations and the rate of each consumable required to support the given activity. The data worksheets provide for the uniform specification of consumables data, allows for the ready identification of the consumables affected by a given activity, and facilitates the updating process. An activity and the data that must be included in the data worksheets are defined and an example of its use and application the consumables data requirements for the performance of the EVA are presented. Author

N77-21176*# Techno-Sciences, Inc., Annapolis, Md.
DATA PROCESSING/DISPLAY DESIGN FOR THE SPACE SHUTTLE/SPACELAB ELECTROMAGNETIC ENVIRONMENT EXPERIMENT (EEE) Final Report, Jul. 1975 - Aug. 1976
L. D. Davisson Aug. 1976 61 p
(Contract NAS5-22458)
(NASA-CR-152485; TSI-76120) Avail: NTIS HC A04/MF A01 CSCL 14B

Methods for data analysis, data compression including universal coding, storage and retrieval on random access storage devices, and display were developed and implemented on the GSFC Interdata computer. The original 64 bit per frequency band representation was reduced to 10 bits through source coding/universal coding, a compression ratio of 6.4, prior to storage. Rapid encoding/decoding was achieved by the algorithms used so that rapid random access is retained. Author

N77-23176# Defense Systems Management School, Fort Belvoir, Va.
SPACE SHUTTLE: A CASE STUDY IN ECONOMIC ANALYSIS
Byron Theurer Apr. 1976 44 p refs
(AD-A033871) Avail: NTIS HC A03/MF A01 CSCL 22/2

This case study reports on an application of economic analysis, provides examples of the methods, and draws conclusions and comments on lessons learned. It was developed from NASA and contractor primary references and from the author's experiences. In 1971, NASA was faced with a dilemma. The Space Shuttle Program, which had been established to substantially reduce the cost of space operations, was being designed to reduce principally transportation cost. Issues were surfacing which established that this transportation cost emphasis did not account for Shuttle development cost and the great bulk of the costs of a satellite program. OMB, furthermore, was imposing a peak funding ceiling which precluded developing the then baselined configuration. Economic analysis performed by MATHEMATICA, Inc., succeeded in establishing the economic worth of Shuttle and pinpointing the most economical configuration. Of particular interest are the explicit treatment of uncertainty in the data base and the innovative methods used to graphically portray results. GRA

N77-31238*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
DESCRIPTION OF A COMPUTER PROGRAM WRITTEN FOR APPROACH AND APPROACH AND LANDING TEST POST FLIGHT DATA EXTRACTION OF PROXIMITY SEPARATION AERODYNAMIC COEFFICIENTS AND AERODYNAMIC DATA BASE VERIFICATION
David J. Homan 9 Aug. 1977 57 p
(NASA-TM-74938; JSC-13048) Avail: NTIS HC A04/MF A01 CSCL 01A

A computer program written to calculate the proximity aerodynamic force and moment coefficients of the Orbiter/Shuttle Carrier Aircraft (SCA) vehicles based on flight instrumentation is described. The ground reduced aerodynamic coefficients and instrumentation errors (GRACIE) program was developed as a tool to aid in flight test verification of the Orbiter/SCA separation aerodynamic data base. The program calculates the force and moment coefficients of each vehicle in proximity to the other, using the load measurement system data, flight instrumentation data and the vehicle mass properties. The uncertainty in each coefficient is determined, based on the quoted instrumentation accuracies. A subroutine manipulates the Orbiter/747 Carrier Separation Aerodynamic Data Book to calculate a comparable set of predicted coefficients for comparison to the calculated flight test data. Author

N78-32174*# Teledyne Brown Engineering, Huntsville, Ala. Space Systems Dept.
STS PAYLOAD DATA COLLECTION AND ACCOMMODATIONS ANALYSIS STUDY. VOLUME 1: EXECUTIVE SUMMARY Final Report
Aug. 1978 23 p refs 3 Vol.
(Contract NAS8-32711)
(NASA-CR-150815; ES78-MSFC-2241-Vol-1) Avail: NTIS HC A02/MF A01 CSCL 22A

The requirements of investigations/instruments and integrated missions to be flown on the Space Transportation System (STS) and the accommodations/resources on the STS actually available for use by these investigations and missions are identified. Deficiencies, areas of concern, and needed improvements in the STS are considered in terms of requirements versus accommodations. A data base developed for investigations/instruments considered in mission planning activities for OSTA is described. J.M.S.

N78-32175*# Teledyne Brown Engineering, Huntsville, Ala. Space Systems Dept.
STS PAYLOAD DATA COLLECTION AND ACCOMMODATIONS ANALYSIS STUDY. VOLUME 2: PAYLOAD DATA COLLECTION Final Report
Aug. 1978 82 p refs 3 Vol.
(Contract NAS8-32711)
(NASA-CR-150816; ES78-MSFC-2241-Vol-2) Avail: NTIS HC A05/MF A01 CSCL 22A

A format developed for Space Transportation System payload data collection and a process for collecting the data are described along with payload volumes and a data deck to be used as input for the Marshall Interactive Planning System. Summary matrices of the data generated are included. J.M.S.

N79-22176*# Teledyne Brown Engineering, Huntsville, Ala. Space Systems Dept.
STS PAYLOAD DATA COLLECTION AND ACCOMMODATIONS ANALYSIS STUDY. VOLUME 3: ACCOMMODATIONS ANALYSIS Final Report
Aug. 1978 49 p refs 3 Vol.
(Contract NAS8-32711)
(NASA-CR-150817; ES78-MSFC-2241-Vol-3) Avail: NTIS HC A03/MF A01 CSCL 22A

Payload requirements were compared to launch site accommodations and flight accommodations for a number of Spacelab payloads. Experiment computer operating system accommodations were also considered. A summary of accommodations in terms of resources available for payload discretionary use and recommendations for Spacelab/STS accommodation improvements are presented. J.M.S.

N79-27232*# Computer Sciences Corp., Houston, Tex. Applied Technology Div.
PRELIMINARY TREND MONITORING SYSTEM DATA MANAGER'S GUIDE Final Report
Lloyd Turberville and Don McCormick May 1979 91 p refs
(Contract NAS9-15700)
(NASA-CR-160251; CSC-0286; JSC-14812) Avail: NTIS HC A05/MF A01 CSCL 22B

The functions and data base structures that the data base manager will be responsible for maintaining are documented. All normal and error sequences are included. J.M.S.

N79-31288*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
FLIGHT DESIGN SYSTEM LEVEL C REQUIREMENTS. SOLID ROCKET BOOSTER AND EXTERNAL TANK IMPACT PREDICTION PROCESSORS
R. H. Leale (McDonnell Douglas Technical Services Co.) Aug. 1979 185 p refs
(NASA-TM-80520; JSC-16072; Rept-79-FM-28) Avail: NTIS HC A09/MF A01 CSCL 22B

The prediction of the SRB and ET impact areas requires six separate processors. The SRB impact prediction processor computes the impact areas and related trajectory data for each SRB element. Output from this processor is stored on a secure file accessible by the SRB impact plot processor which generates the required plots. Similarly the ET RTLS impact prediction processor and the ET RTLS impact plot processor generates the ET impact footprints for return-to-launch-site (RTLS) profiles. The ET nominal/AOA/ATO impact prediction processor and the ET nominal/AOA/ATO impact plot processor generate the ET impact footprints for non-RTLS profiles. The SRB and ET impact processors compute the size and shape of the impact footprints by tabular lookup in a stored footprint dispersion data base. The location of each footprint is determined by simulating a reference trajectory and computing the reference impact point location. To insure consistency among all flight design system (FDS) users, much input required by these processors will be obtained from the FDS master data base. A.R.H.

N79-31289# ARO, Inc., Arnold Air Force Station, Tenn.
DATA VERIFICATION TESTS OF A 0.02-SCALE NASA SPACE SHUTTLE LAUNCH VEHICLE AT MACH NUMBERS FROM 0.60 TO 1.55 Final Report
J. A. Black AEDC 5 Feb. 1979 49 p refs Sponsored by the Air Force
(AD-A069194; AEDC-TSR-79-P7) Avail: NTIS HC A03/MF A01 CSCL 22/2

A 0.02-scale model of the NASA Space Shuttle Integrated Launch Vehicle was tested November 15 and 16, 1978 in the Propulsion Wind Tunnel (16T) at free-stream Mach numbers from 0.60 to 1.55, free-stream dynamic pressures from 388 to 658 psf, angles of attack from -8 to 8 deg, angles of sideslip from -8 to 8 deg, and roll angles of 0, 180, -90, and 90 deg with nominal inboard elevon deflections of 10 deg and outboard elevon deflections of 5 deg. The objectives of the test were to determine applicable angular corrections in the pitch and sideslip planes and to establish, throughout an alpha/beta matrix, a data base for the determination of angular corrections to be applied to previously obtained data. GRA

N80-27412*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
STS-1 OPERATIONAL FLIGHT PROFILE. VOLUME 5: DESCENT, CYCLE 3. APPENDIX C: MONTE CARLO DISPERSION ANALYSIS
Jun. 1980 336 p refs Revised
(NASA-TM-81097; JSC-14483-Vol-5-Rev-1-App-C; Rept-78-FM-51-Vol-5-R-1-App-C) Avail: NTIS HC A15/MF A01 CSCL 22A

The results of three nonlinear the Monte Carlo dispersion analyses for the Space Transportation System 1 Flight (STS-1) Orbiter Descent Operational Flight Profile, Cycle 3 are presented. Fifty randomly selected simulation for the end of mission (EOM) descent, the abort once around (AOA) descent targeted line are steep target line, and the AOA descent targeted to the shallow target line are analyzed. These analyses compare the flight environment with system and operational constraints on the flight environment and in some cases use simplified system models as an aid in assessing the STS-1 descent flight profile. In addition, descent flight envelope are provided as a data base for use by system specialists to determine the flight readiness for STS-1. The results of these dispersion analyses supersede results of the dispersion analysis previously documented. E.D.K.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

A75-37884 * **A distributed data base management system.** A. I. Bryan (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). In: NAECON '75; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, June 10-12, 1975. New York, Institute of Electrical and Electronics Engineers, Inc., 1975, p. 488-491.

Major system design features of a distributed data management system for the NASA Deep Space Network (DSN) designed for continuous two-way deep space communications are described. The reasons for which the distributed data base utilizing third-generation minicomputers is selected as the optimum approach for the DSN are threefold: (1) with a distributed master data base, valid data is available in real-time to support DSN management activities at each location; (2) data base integrity is the responsibility of local management; and (3) the data acquisition/distribution and processing power of a third-generation computer enables the computer to function successfully as a data handler or as an on-line process controller. The concept of the distributed data base is discussed along with the software, data base integrity, and hardware used. The data analysis/update constraint is examined. S.D.

A78-24445 # **A computer-based information system for Spacelab utilization (Rechnergestützes Informationssystem für die Spacelab-Nutzung).** K. Kastlunger, E. Pahlberg, and F. W. Bertram (Industrieanlagen-Betriebsgesellschaft mbH, Ottobrunn, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, 10th, Berlin, West Germany, Sept. 13-15, 1977, Paper 77-057.* 12 p. In German.

Mission planning and experiment management computer programs for the Spacelab and Orbiter are discussed. The programs have been used in conjunction with a data bank to simulate the execution of a variety of mission commands. Experiment status reports, and the status of on-board power supplies, the crew and the cooling system will be obtainable through the information system. J.M.B.

A78-26201 **A numerical model of equatorial and low latitude total electron content for use by satellite tracking systems for ionospheric corrections.** J. A. Klobuchar (Physical Research Laboratory, Ahmedabad, India; USAF, Geophysics Laboratory, Bedford, Mass.), K. N. Iyer, H. O. Vats, and R. G. Rastogi (Physical Research Laboratory, Ahmedabad, India). *Indian Journal of Radio and Space Physics*, vol. 6, Sept. 1977, p. 159-164.

Satellite tracking systems suffer range, range-rate, and angular-refraction errors due to the electrons in earth's ionosphere. To first-order accuracy these effects may be corrected if the total electron content along the path from the satellite to the observing station is known. This paper gives a numerical representation of the seasonal average behavior of the total-electron-content parameter, obtained from actual data taken at both solar minimum and solar maximum. The data used in this numerical representation cover the important latitude range at the equatorial and near-equatorial latitudes where the world's greatest values of total electron content are known to occur. (Author)

A79-45419 # **Azimuth data base errors - Theory and analysis.** R. Salvermoser (Defense Mapping Agency, Hydrographic Center and Topographic Center, Washington, D.C.). In: Guidance and Control Conference, Boulder, Colo., August 6-8, 1979, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1979, p. 658-672. 18 refs. (AIAA 79-1712)

Astronomic azimuth and transfer angle measurement data obtained during a three year period at the Advanced Inertial Test Laboratory (AITL) were analyzed to gain an understanding of the accuracy of the results. The objectives of this investigation were to determine the causes of the errors in astronomic azimuth observations, as well as the reasons for the variations in the value of the azimuth data base. The current accuracy requirement of + or - 0.8 arcsec and the desired accuracy of + or - 0.4 arcsec can presently be obtained if certain precautions are followed. Higher accuracy requirements can be met only when following the recommendations given for the modifications of the observing instruments and methodologies, and when monitoring the movements of the Porro prism support on a continuous basis. Personal errors in azimuth observations were derived from observations and applied to the data to test the validity of their determination. (Author)

A80-40406 * **A new approach to data management and its impact on frequency control requirements.** D. L. Blanchard, A. J. Fuchs, and A. R. Chi (NASA, Goddard Space Flight Center, Greenbelt, Md.). In: Annual Frequency Control Symposium, 33rd, Atlantic City, N.J., May 30-June 1, 1979, Proceedings. Washington, D.C., Electronic Industries Association, 1979, p. 468-472. 7 refs.

A new approach to data management consisting of spacecraft and data/information autonomy and its impact on frequency control requirements is presented. An autonomous spacecraft is capable of functioning without external intervention for up to 72 hr by enabling the sensors to make observations, maintaining its health and safety, and by using logical safety modes when anomalies occur. Data/information are made autonomous by associating all relevant ancillary data such as time, position, attitude, and sensor identification with the data/information record of an event onboard the spacecraft. This record is so constructed that the record of the event can be physically identified in a complete and self-contained record that is independent of all other data. All data within a packet will be time tagged to the needed accuracy, and the time markings from packet to packet will be coherent to a UTC time scale. A.T.

N77-14083*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
DSS RANGE DELAY CALIBRATIONS: CURRENT PERFORMANCE LEVEL
G. L. Spradlin *In its* The Deep Space Network 15 Dec. 1976 p 138-152
Avail: NTIS HC A08/MF A01 CSCL 17B

A means for evaluating Deep Space Station (DSS) range delay calibration performance was developed. Inconsistencies frequently noted in these data are resolved. Development of the DSS range delay data base is described. The data base is presented with comments regarding apparent discontinuities. Data regarding the exciter frequency dependence of the delay values are presented. The improvement observed in the consistency of current DSS range delay calibration data over the performance previously observed is noted. Author

N77-25230# Rome Air Development Center, Griffiss AFB, N.Y.
SPACE SURVEILLANCE SOFTWARE SUPPORT. VOLUME 1, PART 2: RADC TRAJECTORY PROGRAM NUMERICAL/ANALYTIC DATA Final Report
George A. Ellis Oct. 1976 98 p refs
(AF Proj. 6512)
(AD-A033712; RADC-TR-76-261-Vol-1-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 15/3

A numerical and analytical data base is presented for the missile/space vehicle mission analyst. Operational constraints considered were launch site locations, orbital transfer maneuvers, and missile turnout parameters. GRA

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

A76-11320 # **Satellite research applications of digital image generation.** M. B. Faintich (DMA Aerospace Center, St. Louis, Mo.). *American Astronautical Society and American Institute of Aeronautics and Astronautics, Astrodynamics Specialist Conference, Nassau, Bahamas, July 28-30, 1975, AAS Paper 75-083.* 29 p. 8 refs.

Analysis techniques have been made possible using computer generated views of satellites digitally constructed from three-dimensional array descriptions. These techniques were used for applications involving solar illuminated projected areas of satellites. For TIMATION IIIA, radiation pressure was computed from the generated solar views to yield better nominal values for orbit computation programs. The visible projected solar panel area was used to compare various panel configurations as a design tool for the Navigation Technology Satellite-II, and was used to determine best launch date versus power availability for a GEOS-C evaluation study. Computer generated views are shown. (Author)

A77-10443 * **Failure rate analysis of Goddard Space Flight Center spacecraft performance during orbital life.** H. P. Norris and A. R. Timmins (NASA, Goddard Space Flight Center, Greenbelt, Md.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 120-125. 8 refs.

The reported study presents the results of analyses conducted with the aid of both Duane and Weibull growth models. The failure rate values provided may be useful for estimating future space performance, and comparing past, present, and future space performance. Failure rate data from thermal-vacuum system tests are examined and related to the space values. Attention is given to the data base, the time distribution of space malfunctions, limitations on data, and average component reliability for three years in space. G.R.

A77-12188 # **A mass properties computer system for integrating multi-vehicle space programs.** T. Simko and W. R. Damewood (McDonnell Douglas Astronautics Co., Huntington Beach, Calif.). *Society of Allied Weight Engineers, Annual Conference, 35th, Philadelphia, Pa., May 24-26, 1976, Paper 1110.* 44 p.

Occasionally, a series of circumstances and events presents the rich opportunity for mass-properties analysts to examine what they have learned from the past, extract from the reality of the present, and combine this knowledge in preparation for the future. Such a bootstrapping opportunity has recently allowed some mass-properties analysts to up-grade their computerized mass-properties analysis and reporting tools. This paper describes the mass-properties computing system which has evolved, the portions of the system which have been completed, and future work planned. To illustrate solutions to multimodule mass-properties integration problems, a demonstration modular space station is used. The integration solutions are a result of experience from the Delta launch vehicle, the Saturn S-IVB-IB/V flight stages, and the Skylab space station. (Author)

A80-45897 * # **Subsonic stability and control flight test results of the Space Shuttle /tail cone off/.** D. R. Cooke (NASA, Johnson Space Center, Houston, Tex.). In: Atmospheric Flight Mechanics Conference, Danvers, Mass., August 11-13, 1980, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1980, p. 412-421. 7 refs. (AIAA 80-1604)

The subsonic stability and control testing of the Space Shuttle Orbiter in its two test flights in the tailcone-off configuration is discussed, and test results are presented. Flight test maneuvers were designed to maximize the quality and quantity of stability and control data in the minimal time allotted using the Space Shuttle Functional Simulator and the Modified Maximum Likelihood Estimator (MMLE) programs, and coefficients were determined from standard sensor data sets using the MMLE, despite problems encountered in timing due to the different measurement systems used. Results are included for lateral directional and longitudinal maneuvers as well as the Space Shuttle aerodynamic data base obtained using the results of wind tunnel tests. The flight test data are found to permit greater confidence in the data base since the differences found are well within control system capability. It is suggested that the areas of major differences, including lateral directional data with open speedbrake, roll due to rudder and normal force due to elevon, be investigated in any further subsonic flight testing. Improvements in sensor data and data handling techniques for future orbital test flights are indicated. A.L.W.

N75-10886*# Lockheed Electronics Co., Houston, Tex.
SHUTTLE ELECTRICAL POWER ANALYSIS PROGRAM (SEPAP); SINGLE STRING CIRCUIT ANALYSIS REPORT
C. R. Murdock NASA. Lyndon B. Johnson Space Center May 1974 45 p
(Contract NAS9-12200)
(NASA-CR-140301; JSC-09075; LEC-3646) Avail: NTIS HC $3.75 CSCL 22B

An evaluation is reported of the data obtained from an analysis of the distribution network characteristics of the shuttle during a spacelab mission. A description of the approach utilized in the development of the computer program and data base is provided and conclusions are drawn from the analysis of the data. Data sheets are provided for information to support the detailed discussion on each computer run. M.C.F.

N76-27342*# Chrysler Corp., New Orleans, La. Space Div.
TRANSONIC-SUPERSONIC HIGH REYNOLDS NUMBER STABILITY AND CONTROL CHARACTERISTICS OF A 0.015-SCALE (REMOTELY CONTROLLED ELEVON) MODEL 44-0 OF THE SPACE SHUTTLE ORBITER TESTED IN THE VSD HIGH SPEED WIND TUNNEL (LA67) Aerothermodynamic Data Report
May 1976 892 p refs
(Contract NAS9-13247)
(NASA-CR-144607; DMS-DR-2266) Avail: NTIS HC $21.25 CSCL 22B

A detailed aerodynamic data base which can be used to substantiate the aerodynamic design data book for the current shuttle orbiter configuration was generated. Special attention was directed to definition of non-linear aerodynamic characteristics by taking data at small increments in the angle of attack, angle of sideslip, Mach number, and elevon position. Six-component aerodynamic force and moment and elevon position data were recorded over an angle-of-attack range from -2 deg to as high as 32 deg at angles of sideslip of 0 deg, 1 deg, and +2 deg. The test Mach numbers were 0.60, 0.80, 0.90, 1.2, 1.5, 2.0, 3.0, and 4.6. The effects of Reynolds number were investigated and covered a range from 5.0 to 16.0 million per foot. Author

N79-24048*# Hiram Coll., Ohio.
GEOSYNCHRONOUS SATELLITE OPERATING ANOMALIES CAUSED BY INTERACTION WITH THE LOCAL SPACECRAFT ENVIRONMENT
Michael A. Grajek and Donald A. McPherson (Science Applications, Inc.) *In* NASA. Lewis Res. Center Spacecraft Charging Technol., 1978 1979 p 769-782 refs

(Contracts NAS3-21048; F04071-77-C-0166)
Avail: NTIS HC A99/MF A01 CSCL 22B

The dependence of a spacecraft anomaly or event upon geophysical parameters established on the basis of statistical analysis is presented. Examples are provided for establishing relationships between events and parameters such as geomagnetic activity, local time, and events on other spacecraft. Examples illustrated the potential dangers of not using quantitative statistical techniques it was recommended that the data collection planning and statistical analysis planning be done together. Results demonstrate a high correlation between the events and the goephysical parameter being investigated. S.E.S.

N80-21372*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ORBITER/SHUTTLE CARRIER AIRCRAFT SEPARATION: WIND TUNNEL, SIMULATION, AND FLIGHT TEST OVERVIEW AND RESULTS
D. J. Homan, D. E. Denison (Rockwell International Corp., Downey, Calif.), and K. C. Elchert (Rockwell International Corp., Downey, Calif.) May 1980 88 p ref
(NASA-TM-58223) Avail: NTIS HC A05/MF A01 CSCL 22B

A summary of the approach and landing test phase of the space shuttle program is given from the orbiter/shuttle carrier aircraft separation point of view. The data and analyses used during the wind tunnel testing, simulation, and flight test phases in preparation for the orbiter approach and landing tests are reported. E.D.K.

19 SPACECRAFT INSTRUMENTATION

For related information see also 06 Aircraft Instrumentation and 35 Instrumentation and Photography.

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

A77-38592 # **Status of nozzleless solid rocket motor internal ballistics analysis.** D. P. Harry. *American Institute of Aeronautics and Astronautics and Society of Automotive Engineers, Propulsion Conference, 13th, Orlando, Fla., July 11-13, 1977, AIAA Paper 77-910.* 5 p.

The status of a computer program to analyze nozzleless motors is reviewed with emphasis on the distinction between theoretical analysis and experimental evaluation. The most obvious difference in the ballistics of a nozzleless motor, when compared to conventional solid motors, is the aerodynamic throat. The throat is located in the flexible propellant and may move up-stream or down-stream during the burn. Consequently, transient aerodynamics and port pressure drop, erosive burning, combustion efficiency, transient deflection of the grain, and two-phase flow losses all interact. The paper will emphasize the problems and approach used to refine a theoretical-empirical calculation of six or seven phenomena when two channels of data usually represent the observed results, namely head pressure and thrust. A brief review of recent changes in the computer program will be included. Changes include logic to study integral ramjet geometry and a ten-to-one gain in computation speed. Evaluation of erosive burn rate calculations with stronger theoretical basis is in progress. (Author)

A77-48852 * **Development of the data base for a degradation model of a selenide RTG.** G. Stapfer and V. C. Truscello (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). In: Intersociety Energy Conversion Engineering Conference, 12th, Washington, D.C., August 28-September 2, 1977, Proceedings. Volume 2. La Grange Park, Ill., American Nuclear Society, Inc., 1977, p. 1271-1278. 5 refs. Contracts No. AT(04-3)-959; No. NAS7-100.

The paper is concerned with the evaluation of the materials used in a selenide radioisotope thermoelectric generator (RTG). These materials are composed of n-type gadolinium selenide and n-type copper selenide. A three-fold evaluation approach is being used: (1) the study of the rate of change of the thermal conductivity of the material, (2) the investigation of the long-term stability of the material's Seebeck voltage and electrical resistivity under current and temperature gradient conditions, and (3) determination of the physical behavior and compatibility of the material with surrounding insulation at elevated temperatures. Programmatically, the third category of characteristic evaluation is being emphasized. B.J.

A80-48178 # **Statistical analysis of Ni-Cd battery degradation and applications to new spacecraft designs.** W. J. Billerbeck (COMSAT Laboratories, Clarksburg, Md.). In: Energy to the 21st century; Proceedings of the Fifteenth Intersociety Energy Conversion Engineering Conference, Seattle, Wash., August 18-22, 1980. Volume 1. New York, American Institute of Aeronautics and Astronautics, Inc., 1980, p. 110-118. 6 refs. Research sponsored by the International Telecommunications Satellite Organization.

The paper describes a computer modeling method for predicting satellite Ni-Cd battery in-orbit performance in new spacecraft designs. The method utilizes data base from fitting this model to telemetered discharge data from 36 geosynchronous spacecraft batteries covering 70 cumulative orbit-years of battery operation; these data are analyzed statistically and applied to a new battery design with the same generic type cell. The basic model parameters which characterize the batteries and applications of the model to predictions of new battery performance are examined. A.T.

N77-27184*# Boeing Aerospace Co., Huntsville, Ala.
SOLID ROCKET BOOSTER PERFORMANCE EVALUATION MODEL. VOLUME 4: PROGRAM LISTING
7 Sep. 1974 934 p 4 Vol.
(Contract NAS8-29643)
(NASA-CR-150338; D256-10020-4-Vol-4) Avail: NTIS HC A99/MF A01 CSCL 21H

All subprograms or routines associated with the solid rocket booster performance evaluation model are indexed in this computer listing. An alphanumeric list of each routine in the index is provided in a table of contents. Author

N78-10080*# Hughes Research Labs., Malibu, Calif.
EXTENDED PERFORMANCE SOLAR ELECTRIC PROPULSION THRUST SYSTEM STUDY. VOLUME 4: THRUSTER TECHNOLOGY EVALUATION Final Report, 14 Feb. - 29 Aug. 1977
R. L. Poeschel, E. I. Hawthorne, Y. C. Weisman, M. Frisman, G. C. Benson, R. J. McGrath, R. M. Martinelli, T. L. Linsenbardt, and J. R. Beattie Sep. 1977 110 p refs Prepared in cooperation with Hughes Space and Communications Group, Los Angeles
(Contract NAS3-20395)
(NASA-CR-135281) Avail: NTIS HC A06/MF A01 CSCL 21C

Several thrust system design concepts were evaluated and compared using the specifications of the most advanced 30 cm engineering model thruster as the technology base. Emphasis was placed on relatively high power missions (80 to 100 kW) such as a Halley's comet rendezvous. The extensions in thruster performance required for the Halley's comet mission were defined and alternative thrust system concepts were designed in sufficient detail for comparing mass, efficiency, reliability, structure, and thermal characteristics. Confirmation testing and analysis of thruster and power processing components were performed, and the feasibility of satisfying extended performance requirements was verified. A baseline design was selected from the alternatives considered, and the design analysis and documentation were refined. The baseline thrust system design features modular construction, conventional power processing, and a concentrator solar array concept and is designed to interface with the Space Shuttle. Author

N78-20280*# TRW Defense and Space Systems Group, Redondo Beach, Calif. Power Conversion Electronics Dept.
EXTENDED PERFORMANCE ELECTRIC PROPULSION POWER PROCESSOR DESIGN STUDY. VOLUME 1: EXECUTIVE SUMMARY Final Report, 1 May - 26 Oct. 1977
J. J. Biess, L. Y. Inouye, and A. D. Schoenfeld Nov. 1977 83 p
(Contract NAS3-20403)
(NASA-CR-135357; TRW-31526.000-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 21C

Several power processor design concepts were evaluated and compared. Emphasis was placed on a 30cm ion thruster power processor with a beam supply rating of 2.2kW to 10kW. Extensions in power processor performance were defined and were designed in sufficient detail to determine efficiency, component weight, part count, reliability and thermal control. Preliminary electrical design, mechanical design, and thermal analysis were performed on a 6kW power transformer for the beam supply. Bi-Mod mechanical, structural, and thermal control configurations were evaluated for the power processor, and preliminary estimates of mechanical weight were determined. A program development plan was formulated that outlines the work breakdown structure for the development, qualification and fabrication of the power processor flight hardware. Author

N79-10089*# Lockheed Missiles and Space Co., Huntsville, Ala.
INVESTIGATION OF JET EXHAUST AND LOCAL MACH

NUMBER EFFECTS ON THE SOLID ROCKET BOOSTER (SRB) BASE PRESSURES (FA19) Final Report
Don A. Love Jan. 1978 135 p refs
(Contract NAS8-29752)
(NASA-CR-150803; LMSC-HREC-TR-D568157) Avail: NTIS HC A07/MF A01 CSCL 21H

Two single nozzles with flare angles of 10 and 20 degrees were tested at Mach numbers of 0.5, 0.9, 1.2, 1.46, 1.96 and 3.48 in the presence of gaseous plumes. An attempt was made to determine the local Mach number above the flare by utilizing a pitot probe. This objective was only partially satisfied because the 20 degree flare seperated the flow ahead of the flare for Mach numbers of 0.5 to 1.96. An accurate local Mach number could not be determined because of the seperated flow. To meet the objective of a data base as a function of freestream Mach number, model surface and base pressures were obtained in the presence of gaseous plumes for a matrix of chamber pressures and temperatures at Mach numbers of 0.5, 0.9, 1.2, 1.46, 1.96 and 3.48. G.G.

N80-15203*# Aerojet Liquid Rocket Co., Sacramento, Calif.
ADVANCED OXYGEN-HYDROCARBON ROCKET ENGINE STUDY Monthly Progress Report, 15 Oct. - 30 Nov. 1979
C. J. OBrien 10 Dec. 1979 31 p
(Contract NAS8-33452)
(NASA-CR-161350; MPR-33452M-1) Avail: NTIS HC A03/MF A01 CSCL 21H

A consistent engine system data base was generated for defining advantages and disadvantages, system performance and operating limits, engine parametric data, and technology requirements for candidate high pressure LO2/HC engine systems. Optimum LO2/HC engine power cycles were synthetized and representative conceptual engine design generated for a specified advanced surface to orbit transportation system. M.M.M.

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

A77-33346 * # **A thermochemical data bank for cycle analysis.** R. Carty, J. Funk, W. Conger, M. Soliman (Kentucky, University, Lexington, Ky.), and K. Cox. In: World Hydrogen Energy Conference, 1st, Miami Beach, Fla., March 1-3, 1976, Proceedings. Volume 1. Coral Gables, Fla., University of Miami; New York, Pergamon Press, 1976, p. 6A-81 to 6A-86. 10 refs. Grant No. NGR-18-001-086.

The use of the computer program PAC-2 to produce a thermodynamic data bank for various materials used in water-splitting cycles is described. The sources of raw data and a listing of 439 materials for which data are presently available are presented. This paper also discusses the use of the data bank in conjunction with two other programs, CEC-72 and HYDRGN. The integration of these three programs implement an evaluation procedure for thermochemical water splitting cycles. CEC-72 is a program used to predict the equilibrium composition of the various chemical reactions in the cycle. HYDRGN is a program which is used to calculate changes in thermodynamic properties, work of separation, amount of recycle, internal heat regeneration, total thermal energy and process thermal efficiency for a thermochemical cycle. (Author)

N78-20253# Sandia Labs., Albuquerque, N. Mex.
MATERIALS COMPATIBILITY INFORMATION DATA BANK
K. E. Mead 1977 10 p Presented at the 5th ERDA Compatibility Meeting, Miamisburg, Ohio, 4 Oct. 1977
(Contract EY-76-C-04-0789)
(SAND-77-1237C; Conf-771012-1) Avail: NTIS HC A02/MF A01

A major concern in the design of weapons systems is the compatibility of the materials used with each other and with the enclosed environment. Usually these systems require long term storage with a high reliability for proper function at the end of this storage period. Materials selection is then based on both past experience and laboratory accelerated aging experiments to assure this long term reliability. To assist in the task of materials selection a computerized materials compatibility data bank is being established. This data bank will provide a source of annotated information and references to personnel and documents for both the designer and materials engineer to draw on for guidance in materials selection. The data bank storage and information retrieval philosophy are discussed and procedures for information gathering outlined. Examples of data entries and search routines are presented to demonstrate the usefulness and versatility of the proposed system. ERA

24 COMPOSITE MATERIALS

Includes laminates.

A79-16984 **Bibliographic and numeric data bases for fiber composites and matrix materials.** F. E. McMurphy and T. M. Quick (California, University, Livermore, Calif.). In: ICCM/2; Proceedings of the Second International Conference on Composite Materials, Toronto, Canada, April 16-20, 1978. Warrendale, Pa., Metallurgical Society of AIME, 1978, p. 33-43. 8 refs. Contract No. W-7405-eng-48.

The Data Management Group at the Lawrence Livermore Laboratory is conducting research leading to the creation of data bases for energy storage systems. These data bases are computer-based and will contain bibliographic information, material properties data, and data on essential criteria for energy storage systems. Access to these central files will be from remote terminals over computer networks and by telephone dialup, in addition to the more conventional means of computer-generated reporting, and dissemination on magnetic tapes. Bibliographic and numerical data bases have been created for fiber composites and matrix materials, with particular emphasis on their application to modern flywheel technology. B.J.

N77-22188# Prototype Development Associates, Inc., Santa Ana, Calif.
EVALUATION OF CARBON-CARBON COMPOSITE NOSETIP MATERIALS Final Report, 1 Jul. 1975 - 30 Apr. 1976
John R. Stetson and J. C. Schutzler Oct. 1976 184 p refs
(Contract DAAG46-75-C-0099)
(AD-A033540; PDA-TR-1042-00-09; AMMRC-CTR-76-34) Avail: NTIS HC A09/MF A01 CSCL 11/4

Fourteen orthogonally-reinforced carbon-carbon materials were evaluated for application to terminal defense interceptor (ATDI) nosetip concepts. The preforms were woven from four different types of graphite yarns manufactured from PAN, rayon and an experimental pitch-precursor. Weave geometries represented a complete range of preform characteristics in terms of weave fineness and balance. Ablation tests were performed at three stagnation presure levels up to 168 atmospheres, and post-test analyses of the material ablation performance were conducted. Five of the most promising materials were strength-tested, and a complete engineering properties data base was developed for one of the materials (AMMRC/FMI 221). Nosetip designs were developed for a typical ATDI mission, and four prototype full-scale models were fabricated and tested in a high pressure rocket exhaust facility. One nosetip model of AMMRC/FMI 221 was fabricated for flight test and analyzed for thermal and structural performance. It was demonstrated in this program that certain fine-weave carbon-carbon materials of the type evaluated will provide stable, symmetric nosetip shapes while undergoing high pressure, turbulent recession in ATDI environments. In addition, it was shown that these materials can be

tailored, by weave configuration design, for specific bending strength requirements. Intercept missions through severe weather environments require an erosion-resistant subtip such as tungsten.
Author (GRA)

N77-33272# RAND Corp., Santa Monica, Calif.
ADVANCED COMPOSITES: ELECTROMAGNETIC PROPERTIES, VULNERABILITIES, AND PROTECTIVE MEASURES Interim Report
A. L. Hiebert May 1977 55 p refs Sponsored by AF
(AD-A042043; R-1979-AF) Avail: NTIS HC A04/MF A01
CSCL 11/4

This report outlines and discusses a measurement and analysis program for assessing the electromagnetic (EM) properties and vulnerabilities of, and protective measures for, advanced composite materials used in the design and construction of aerospace vehicles. The main objective is to suggest areas for investigation and the kind of information needed for the compilation of a data base. Six areas of investigation are discussed: advanced composite materials, structural composition, and fabrication; potential use of composite materials and structures; fundamental EM parameters of advanced composites; energy sources and environments of EM hazards; EM vulnerabilities and shielding effectiveness criteria; protective measures. Examples of measurement techniques and/or essential data are given for each. A suggested format for cataloging the information is included.
Author (GRA)

N78-11202# Lockheed-California Co., Burbank. Rye Canyon Research Lab.
ASCERTAINMENT OF THE EFFECT OF COMPRESSIVE LOADING ON THE FATIGUE LIFETIME OF GRAPHITE EPOXY LAMINATES FOR STRUCTURAL APPLICATIONS Final Technical Report, 13 Feb. 1975 - 22 Sep. 1976
J. T. Ryder and E. K. Walker Wright-Patterson, AFB, Ohio AFAL Dec. 1976 271 p refs
(Contract F33615-75-C-5118)
(AD-A043365; AFML-TR-76-241) Avail: NTIS HC A12/MF A01 CSCL 11/4

The main objective of this research investigation was the experimental determination of the effect of compressive loading on the fatigue response of graphite/epoxy laminates. The primary emphasis of the program was on the accumulation of a statistically significant data base. The data base was to be used for developing an analytical model with predictive capability to account for the effect of compressive loading. The test program included only unnotched coupons in a room temperature, laboratory air environment. The test program consisted of static tensile and compressive tests; tension-tension and tension-compression fatigue tests; and tensile and compressive residual strength tests of coupons tested either under tension-tension or tension-compression fatigue loading. The development of a large, statistically meaningful data base was accomplished. The general effect of compression on the fatigue response of a graphite/epoxy composite was determined. However, a general model with capability to account for compressive loading was not attempted. As an alternate, the concept of a fatigue threshold was postulated along with consideration of some substantiating data. Analysis of the data showed that due to the extent of data scatter, a model of the 'wear-out' or similar type would predict the need for unacceptably low stress levels to achieve the high probabilities of survival required for aircraft structures.
Author (GRA)

N78-27188# California Univ., Livermore. Lawrence Livermore Lab.
BIBLIOGRAPHIC AND NUMERIC DATA BASES FOR FIBER COMPOSITES AND MATRIX MATERIALS
F. E. McMurphy and T. M. Quick 11 Jan. 1978 12 p refs Presented at 2d Conf. on Composite Material, Toronto, 16 Apr. 1978
(Contract W-7405-eng-48)
(UCRL-79503-Rev-1; Conf-780414-1) Avail: NTIS HC A02/MF A01

Research leading to the creation of bibliographic and numeric data bases of material properties with particular emphasis to their application to modern flywheel technology is reported. The bibliographic data base was created to provide a direct means to visually examine pertinent literature. The numeric data base is being created to provide evaluated materials properties data for direct input to applications programs. Data bases and their evaluation programs will be stored on a PDP 11/70 computer system.
ERA

N79-14167*# Rensselaer Polytechnic Inst., Troy, N. Y.
COMPOSITE STRUCTURAL MATERIALS Semi-annual Progress Report, Apr. - Sep. 1978
George S. Ansell and Stephen E. Wiberley Dec. 1978 84 p refs Sponsored in part by Air Force Office of Scientific Research
(Grant NGL-33-018-003)
(NASA-CR-158023; SAPR-35) Avail: NTIS HC A05/MF A01
CSCL 11D

The purpose of the RPI composites program is to develop advanced technology in the areas of physical properties, structural concepts and analysis, manufacturing, reliability and life prediction. Concommitant goals are to educate engineers to design and use composite materials as normal or conventional materials. A multifaceted program was instituted to achieve these objectives.
Author

N79-30321*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HPLC FOR QUALITY CONTROL OF POLYIMIDES
Philip R. Young and George F. Sykes *In its* Graphite/Polyimide Composites Aug. 1979 p 361-373

Avail: NTIS HC A19/MF A01 CSCL 11D

High Pressure Liquid Chromatography (HPLC) as a quality control tool for polyimide resins and prepregs are presented. A data base to help establish accept/reject criteria for these materials was developed. This work is intended to supplement, not replace, standard quality control tests normally conducted on incoming resins and prepregs. To help achieve these objectives, the HPLC separation of LARC-160 polyimide precursor resin was characterized. Room temperature resin aging effects were studied. Graphite reinforced composites made from fresh and aged resin were fabricated and tested to determine if changes observed by HPLC were significant.
S.E.S.

N80-23372# Air Force Materials Lab., Wright-Patterson AFB, Ohio. Mechanics and Surface Interactions Branch.
FATIGUE CHARACTERIZATION OF COMPOSITE MATERIALS Final Report, 1 Oct. 1978 - 15 Apr. 1979
James M. Whitney Oct. 1979 38 p refs
(AF Proj. 2419)
(AD-A081320; AFML-TR-79-4111) Avail: NTIS HC A03/MF A01 CSCL 11/4

A procedure is outlined which allows the generation of an S-N curve with some statistical value without resorting to an extremely large data base. The procedure is based on a power law representation of the S-N curve and a two-parameter Weibull Distribution for time-to-failure at a specific stress level. A data pooling scheme is also discussed which allows the determination of a fatigue shape parameter which is independent of stress level.
GRA

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

A79-38854 # **Statistical analysis of steady-state combustion of composite solid propellants.** R. L. Glick (Dayton, University, Dayton, Ohio). *AIAA, SAE, and ASME, Joint Propulsion Conference, 15th, Las Vegas, Nev., June 18-20, 1979, AIAA Paper 79-1130.* 7 p. 8 refs. Contract No. F49620-76-C-0008.

Statistical combustion modeling for determining the effects of oxidizer particle size for optimal design of solid propellant rockets is presented. Application of optimal design techniques requires that the propellant's ballistic parameters be expressed in terms of the local motor environment and formulation variables. Since complete ballistic characterization of the propellant contains too many elements to be implementable in a tactical program, improved utilization of the sparse data and characterization methods are offered by statistical combustion models which offer a statistical framework and a detailed unit combustion model. Thus a statistical framework plus unit combustion model or the statistical framework alone to correlate data can be employed. The latter offers potential advantages for propellants with additives because of difficulties associated with modeling additive effects. These calculations have shown that rate/particle size data can be correlated and diameter dependent pseudo-propellant properties extracted for formulations with and without additives. A.T.

N76-13286# Picatinny Arsenal, Dover, N.J.
IDENTIFICATION OF EXPLOSIVES BY X-RAY DIFFRACTION
J. E. Abel and P. J. Kemmey May 1975 56 p refs
(AD-A013378; PA-TR-4786) Avail: NTIS CSCL 19/1

This report presents a computer program for producing a data bank of X-ray diffraction patterns on explosives and explosive mixtures. The data to be used in this data bank is obtained from a diffractometer, Debye-Scherer films, and a Gandolfi camera. The computer program allows the rapid retrieval of X-ray data on any explosive in the file, and also the identification of unknown explosives with ones in the file, using statistical matching techniques. Author (GRA)

N77-12169# Washington Univ., Seattle. Chemometrics Lab.
IMPROVING THE RELIABILITY OF FACTOR ANALYSIS OF CHEMICAL DATA BY UTILIZING THE MEASURED ANALYTICAL UNCERTAINTY Technical Report, Nov. 1975 - Jun. 1976
D. L. Duewer, B. R. Kowalski, and J. L. Fasching Jun. 1976 57 p
(Contract N00014-75-C-0536; NR Proj. 051-565)
(AD-A025951; TR-9) Avail: NTIS HC A04/MF A01 CSCL 07/4

A procedure for including measured analytical uncertainty into data analysis methodology is discussed. The suitability of various dispersion matrices and matrix rank determination criteria for data having analytical uncertainty is investigated. A criterion useful for judging the number of factors insensitive to analytical uncertainty is presented. A model data structure for investigating the behavior of factor analysis techniques is described and analyzed. Author (GRA)

N77-28266# General Electric Co., Santa Barbara, Calif. DASIAC.
REACTION RATE DATA, NUMBER 57
Aug. 1976 24 p
(Contract DNA001-75-C-0023)
(AD-A038749) Avail: NTIS HC A02/MF A01 CSCL 07/2

This issue of the DASIAC Reaction Rate Data presents summaries of recent progress for investigations supported by the Defense Nuclear Agency in portions of its Reaction Rate Program, plus summaries of related work submitted by other, non-DNA-funded investigators. GRA

N78-25162# National Technical Information Service, Springfield, Va.
ELECTRODIALYSIS DESALINATION. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Mar. 1978
Diane M. Cavagnaro Mar. 1978 150 p Supersedes NTIS/PS-77/0018; NTIS/PS-76/0011; NTIS/PS-75/135
(NTIS/PS-78/0243; NTIS/PS-77/0018; NTIS/PS-76/0011; NTIS/PS-75/135) Copyright Avail: NTIS HC $28.00/MF $28.00 CSCL 07D

A bibliography containing 145 abstracts on Federally funded research presents annotated references on electrodialysis desalination, theory, membrane preparation and performance, and test and pilot plant operations. Reports are cited which cover water treatment operations as well as waste treatment processes. Author

N79-14168# Fein-Marquart Associates, Inc., Baltimore, Md.
APPROACHES FOR THE ACQUISITION OF MASS SPECTRAL DATA FOR INCLUSION IN THE NIH/EPA/MSDC MASS SPECTRAL DATA BASE Final Report, 31 Oct. 1977 - 31 Mar. 1978
D. P. Martinsen Mar. 1978 33 p refs
(Grant NSF AEN-77-19673)
(PB-285868/6; FMA-375; NSF/RA-780242) Avail: NTIS HC A03/MF A01 CSCL 07D

Ways in which mass spectral data, particularly that being generated with the support of government funds could be made available for addition to the mass spectral data base were investigated. Contacting the producers directly was found to be the most fruitful method to acquire spectra. Possible means of locating the producers are discussed. Trying to establish policies governing the reporting of data under government research grants seems an almost impossible task. Obtaining spectra directly from the primary journals is not worthwhile in most cases; however, the journals do seem to be a good source of the identity of the producers of mass spectra. GRA

N79-22180# National Physical Lab., Teddington (England). Div. of Chemical Standards.
PROSPECTIVE NEEDS FOR PHYSICAL PROPERTY DATA IN THE CHEMICAL AND ALLIED INDUSTRIES DURING THE NEXT DECADE
R. P. Miller Jun. 1978 37 p refs
(NPL-Chem-84) Avail: NTIS HC A03/MF A01

Summaries are made of developments and trends which are being forecast for these sectors in order to give some perspective to the appraisal in an economic as well as a technical context. The areas considered include petrochemicals, heavy organics, coal, inorganics, metals and alloys, and water management. The type of data likely to be required to promote technical innovations, process optimization, or environmental control are indicated. The increasing importance of computer-based data banks is argued. Author (ESA)

N80-14226# California Univ., Berkeley. Lawrence Berkeley Lab.
BASIC ENERGY PROPERTIES OF ELECTROLYTIC SOLUTIONS DATABASE
Sidney L. Phillips, H. Ozbek, and R. J. Otto 1978 17 p refs
Presented at the CODATA Conf., Palermo, Italy, 22 May 1978
(Contract W-7405-eng-48)
(LBL-7827; CONF-780587-3) Avail: NTIS HC A02/MF A01

A data center containing bibliographic and numerical data was established to provide evaluated basic energy data on aqueous electrolyte solutions to elevated temperatures and pressures. Correlation equations and data are given for the viscosity, thermal conductivity, density, and enthalpy of aqueous sodium chloride solutions. DOE

N80-23399# California Univ., Berkeley. Lawrence Berkeley Lab. National Geothermal Information Resource.
AQUEOUS SOLUTIONS DATABASE TO HIGH TEMPERATURES AND PRESSURES: NaCl SOLUTIONS
S. L. Phillips, Roland J. Otto, Huseyin Ozbek, and Mehdi Tavana Aug. 1979 30 p refs Presented at the Workshop on Tech. for Meas. of Thermodyn. Properties, Albany, Oreg. 21-23 Aug. 1979
(Contract W-7405-eng-48)
(LBL-9621; CONF-790896-1) Avail: NTIS HC A03/MF A01

Available experimental data on sodium chloride solutions which are used in geothermal energy exploration and development for electrical power production and direct use were surveyed. The data are classified as thermodynamic, transport and physical; they are useful in the design and development of a geothermal area from brine production through utilization, to brine disposal. An ideal data system for geothermal energy is described. DOE

N80-25404# California Univ., Livermore. Lawrence Livermore Lab.
SUMMARY AND REVIEW OF HYDROGEN THEORETICAL EQUATION-OF-STATE MODELS AT LAWRENCE LIVERMORE LABORATORY
H. C. Graboske, Jr. and K. L. Wong 1 Feb. 1980 39 p refs
(Contract W-7405-eng-48)
(UCID-18489) Avail: NTIS HC A03/MF A01

A review and analysis of the hydrogen equations of state (EOS) are presented. Careful comparison to experimental data and among EOS's are performed and evaluated. The new hydrogen EOS (EOS95) and its representations produce the best agreement with experimental data and hydrodynamic simulation studies. DOE

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N75-14803# Ohio State Univ. Research Foundation, Columbus.
DEVELOPMENT OF A DESIGN HANDBOOK ON STRESS-CORROSION CRACKING Semiannual Report, 15 Dec. 1973 - 15 May 1974
Roger W. Staehle and Markus O. Speidel Sep. 1974 25 p refs
(Contract N00014-67-A-0232; ARPA Order 2818)
(AD-787140; OSURF-3878-1) Avail: NTIS CSCL 11/6

Significant progress has been made in compiling the data base from which the contents of the handbook on stress corrosion cracking will be extracted. In the first effort, extensive computerized literature searches were done. A second effort to collect available information on stress corrosion cracking was undertaken by contacting in writing more than two hundred recognized specialists active in this field. Early results of these efforts are presented. Author (GRA)

N75-20664# Boeing Commercial Airplane Co., Seattle, Wash.
DEVELOPMENT OF STATISTICAL FATIGUE FAILURE CHARACTERISTICS OF 0.125 INCH 2024-T3 ALUMINUM UNDER SIMULATED FLIGHT-BY-FLIGHT LOADING Final Report, Aug. 1972 - Mar. 1974
J. P. Butler and D. A. Rees Jul. 1974 186 p refs
(Contract F33615-72-C-2003; AF Proj. 7351)
(AD-A002310; AFML-TR-74-124) Avail: NTIS CSCL 11/6

Thirty-two unique multidetail specimens were tested to develop a data base for investigating the statistical materials/structures fatigue failure characteristics of 2024-T3 aluminum alloy in the form of 0.225-in.-thick sheet. The test loading was a random-load, flight-by-flight loading block spectrum repeated to obtain crack initiation. Six different basic spectra, representative of cargo/transport or gust load flights, were applied to the specimens. Fatigue crack initiation was detected and controlled to a nominal crack length of about 0.04 in. from the edge of the hole by a painted crack detection circuit system. After detection of crack initiation, each hole was restored to an undamaged state by oversizing and coldworking. A statistical analysis of the data by previously developed maximum likelihood methods is presented for both scale and shape parameters of the log-normal and two-parameter Weibull distributions. GRA

N76-25396# Mechanical Properties Data Center, Traverse City, Mich.
ANNUAL REPORT (13TH) OF THE MECHANICAL PROPERTIES DATA CENTER Report for period ending 15 Sep. 1974 - 15 Sep. 1975
Robert C. Braden Nov. 1975 34 p refs
(Contract DSA900-75-C-2916)
(AD-A019387; AMMRC-CTR-75-31) Avail: NTIS CSCL 11/6

This report reviews and discusses the continuing operation and development of the Mechanical Properties Data Center. Activity and growth of the Center are discussed in terms of the six major work areas: Input, File Maintenance, Output, Systems Development, Management and Marketing-Sales. GRA

N78-24363# Open Univ., Milton (England). Energy Research Group.
COPPER AND ALUMINIUM: A DATA BASE FOR A PHYSICAL INPUT/OUTPUT STUDY
Rosalind Armson Jan. 1978 35 p refs
Avail: NTIS HC A03/MF A01; Secr., Energy Research Group, Walton Hall, Milton Keyes, Engl.

The data base presented is part of the data assembled for a project concerned with investigating the effects of technical change upon the industrial system of the U. K. The model used is an input-output table in which the commodity flows in the industrial system are traced in terms of physical quantities rather than monetary terms, as is more conventional. A technique in which two transaction matrices, a make matrix and a technology matrix, are combined with a vector of final demand using a vector of activity levels was developed. The model was applied to copper and aluminum. Author (ESA)

N78-28196# National Technical Information Service, Springfield, Va.
FERROUS METALS CASTING. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Mar. 1978
Mona F. Smith Mar. 1978 226 p Supersedes NTIS/PS-77/0246; NTIS/PS-76/0142; NTIS/PS-75/223
(NTIS/PS-78/0287; NTIS/PS-77/0246; NTIS/PS-76/0142; NTIS/PS-75/223) Copyright. Avail: NTIS HC $28.00/MF $28.00 CSCL 11F

Federally sponsored research covered includes casting processes, heat treatment, quality control, solidification, microstructure, mechanical properties, additives, and purification. Studies are included on casting and its involvement in scrap reuse, air pollution, and tool manufacture. An updated bibliography containing 221 abstracts is presented. Author

N78-28197# National Technical Information Service, Springfield, Va.
FERROUS METAL CASTING, VOLUME 2. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Mar. 1978
Mona F. Smith Mar. 1978 336 p Supersedes NTIS/PS-77/0248
(NTIS/PS-78/0288; NTIS/PS-77/0248) Copyright. Avail: NTIS HC $28.00/MF $28.00 CSCL 11F

Worldwide research is cited on iron and steel continuous casting, die casting, and precision casting. Studies on molds, mold release agents, shrinkage, solidification, defects, and additives are included. An updated bibliography containing 329 abstracts is presented. Author

N79-22200# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
TITANIUM DAMAGE TOLERANT DESIGN DATA FOR PROPULSION SYSTEMS Final Report, 1 Jun. 1975 - 30 Apr. 1977
James R. Beyer, David L. Sims, and Raymond M. Wallace Aug. 1977 93 p refs
(Contract F33615-75-C-5130)
(AD-A053252; FR-8480; AFML-TR-77-101) Avail: NTIS HC A05/MF A01 CSCL 11/6

The program consisted of crack growth threshold, crack growth rate, and fracture toughness testing for each alloy plus strain controlled low cycle fatigue crack initiation testing on Ti 8-1-1. The effects of stress ratio, cyclic frequency, and temperature were determined, providing a broad data base for damage tolerant design of titanium gas turbine engine components. GRA

N79-22201# National Technical Information Service, Springfield, Va.
CRYOGENIC PROPERTIES OF ALUMINUM AND ALUMINUM ALLOYS. CITATIONS FROM THE NTIS DATA BASE Final Report, 1964 - May 1979
Mona F. Smith Jun. 1979 140 p Supersedes NTIS/PS-77/0503; NTIS/PS-76/0353
(NTIS/PS-79/0611/2; NTIS/PS-77/0503; NTIS/PS-76/0353) Avail: NTIS HC $28.00/MF $28.00 CSCL 11F

This updated bibliography contains 134 abstracts, 21 of which are new entries to the previous edition. Citations of Federally-funded research include studies on the cryogenic properties of aluminum and its alloys used in superconducting machinery, magnets, space technology, and nuclear reactors. Electrical properties, fatigue, deformation, and welds are included. GRA

N79-22202# National Technical Information Service, Springfield, Va.
CRYOGENIC PROPERTIES OF ALUMINUM AND ALUMINUM ALLOYS. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Final Report, 1970 - May 1979
Mona F. Smith Jun. 1979 90 p Supersedes NTIS/PS-77/0504; NTIS/PS-76/0354
(NTIS/PS-79/0612/0; NTIS/PS-77/0504; NTIS/PS-76/0354) Avail: NTIS HC $28.00/MF $28.00 CSCL 11F

This updated bibliography contains 92 abstracts, 17 of which are new entries to the previous edition. Worldwide research on aluminum and its alloys in liquefied gas tanks, superconducting devices, pressure vessels, and spacecraft components are cited. Studies on welds, fracture, and mechanical properties are included. GRA

N79-22214# National Physical Lab., Teddington (England). Div. of Chemical Standards.
THE CALCULATION OF MULTICOMPONENT ALLOY PHASE DIAGRAMS AT THE NATIONAL PHYSICAL LABORATORY
T. G. Chart, F. H. Putland, and A. T. Dinsdale Aug. 1978 22 p refs Sponsored by the Min. of Defence Procurement Executive
(NPL-Chem-91) Avail: NTIS HC A02/MF A01

A computerized data bank, ALLOYDATA, was established for the computation of ternary and quaternary phase diagrams relevant to heat resistant alloys from thermodynamic data. Using Gibbs energy minimization techniques, the phase diagrams of transition metals, carbon aluminum, and silicon were computed; data pertinent to eutectic solidification and the avoidance of the embrittling sigma phase are given. The systems Co-Cr-Zr, Co-Cr-Ni, and Cr-Fe-Ni are discussed. Author (ESA)

N79-22303# Fracture Control Corp., Goleta, Calif.
NUCLEAR PRESSURE VESSEL STEEL DATA BASE
W. L. Server and W. Oldfield Dec. 1978 498 p refs Sponsored by Electric Power Research Inst.
(EPRI-NP-933) Avail: NTIS HC A21/MF A01

Data was collected in a computer data base for 7 base metals which include heat descriptions, manufacturing and fabrication information, chemistry, temperature-dependent regression analyses (tensile, charpy, and precracker charpy), and regression statistics. All entries in the data base are identified by a set of codes termed keywords. The computer data base is presented for each material type, and all pertinent data are shown in both a graphical and tabular form. DOE

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N78-31294# National Bureau of Standards, Washington, D. C.
DEVELOPMENT OF A DATA BASE FOR ASSESSING PLASTIC FIRE HAZARDS
James A. Slater Apr. 1978 39 p refs Sponsored in part by Consumer Product Safety Commission, Wash., D. C.
(PB-280027/4; NBSIR-78-1422) Avail: NTIS HC A03/MF A01 CSCL 11I

A data base of residential fire accidents developed to assess some of the real-life hazards associated with fire incidents involving plastics is described. The data consists of detailed case history reports based on a questionnaire form developed at the National Bureau of Standards and laboratory tests of samples retrieved at the fire scene. The major criteria for a fire incident included in the data base are that an identifiable plastic product played a significant role in the fire and the sequence of events can be partially reconstructed. Information is collected about the building environment in which the fire occurred, the products and the persons involved in the incident, and the fire development and extinguishment. Sample tabulations of field and laboratory data from the first 25 accident cases are shown. GRA

N78-33248# IIT Research Inst., Chicago, Ill.
ASME REPORT ON CHEMICAL EFFECTS OF LUBRICATION IN CONTACT FATIGUE. VOLUME 2 Summary Report, Apr. 1976 - Feb. 1978
S. Bhattacharyya and M. A. H. Howes May 1978 71 p ref Sponsored by ASME
(PB-280980/4 ASME/RCL 1977/1; ASME/RCL 1978/1) Avail: NTIS HC A04/MF A01 CSCL 13I

Contact fatigue tests with synthetic oil in geared roller testing machines were carried out. The tests were used to extend the data base for synthetic oil so that significant Weibull analysis could be made to determine the effect of additive on Weibull slope and stress life exponent. Chemical effects of lubrication in contact fatigue were studied. The supplemental phase of the program extended the data base for synthetic oil established in the initial phases of the program. GRA

N79-22342# SKF Industries, Inc., King of Prussia, Pa. Technology Services Div.
RESEARCH REPORT ON PERFORMANCE OF AUTOMOTIVE WHEEL BEARING GREASES Final Report, Mar. 1977 - Oct. 1978
N. J. Ninos, F. R. Morrison, J. I. McCool, and J. Rumierz Oct. 1978 128 p refs
(Contract DAAK70-77-C-0034)
(AD-A066829; SKF-AL78T022) Avail: NTIS HC A07/MF A01 CSCL 11/8

The objective of this program is to establish the relative performance characteristics of six greases in a simulated automotive front wheel tapered roller bearing environment under highly accelerated laboratory type test conditions. Part I deals with the evaluation of the test greases in a test machine designed to simulate the general configuration of an automotive front wheel bearing hub. Part II included a more detailed study of representative bearings to define the degree of deterioration experienced on the rolling contact surfaces of the bearings lubricated with each grease. Photomicrographs made with a Scanning Electron Microscope show the changes to the surface morphology of the cone rolling contact surfaces. Part III presents information on the changes occurring to the grease chemistry and structure from use in an elevated temperature bearing environment. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N77-13232# Mitre Corp., McLean, Va.
SURVEY OF ALCOHOL FUEL TECHNOLOGY, VOLUME 1
Bernard Beratz, Robert Ouellette, Wayne Park, and Betsy Stokes
Nov. 1975 143 p refs 2 Vol.
(Contract NSF C-925)
(PB-256007/8; M74-61-Vol-1) Avail: NTIS HC A07/MF A01

Information on alcohols as fuels is presented. Current and ongoing research is tabulated. GRA

N78-17231# Thiokol Corp., Huntsville, Ala.
STATISTICAL ANALYSIS OF STEADY STATE COMBUSTION OF NONMETALLIZED COMPOSITE SOLID PROPERTIES Interim Report, 1 Jul. 1976 - 30 Sep. 1977
R. L. Glick Sep. 1977 57 p refs
(Contract F49620-76-C-0008)
(AD-A047491; U-77-08; AFOSR-77-1277TR) Avail: NTIS HC A04/MF A01 CSCL 21/8

The combustion model including aluminum and iron oxide was employed to correlate data bases of Miller and Maykut. Results for additive free formulations were excellent for both rate and exponent; results for formulations with aluminum and aluminum plus iron oxide were poor. A new method for extracting particle size dependent information from rate/response function/formulation data was developed from the statistical methodology itself and employed to process the aforementioned data bases. Results were encouraging; Miller's additive free and aluminum plus iron oxide data correlated very well; Miller's aluminum data showed that the increasing aluminum particle size increases interactions between oxidizer modes; Maykut's data base showed that aluminum induced interactions among oxidizer modes are decreased as iron content increases. Results elucidate mechanisms for rate, exponent, and response function control and show that the equal rate hypothesis employed in much combustion modeling is incorrect. A new approach for including the effects of transients introduced by particle size dependent rates in both steady and nonsteady combustion modeling was conceived. Author (GRA)

N79-31403*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMOPHYSICAL PROPERTY DATA: WHO NEEDS THEM?
R. C. Hendricks 1979 27 p refs Proposed for presentation at the Winter Ann. Meeting of the ASME, N. Y., 2-7 Dec. 1979
(NASA-TM-79241; E-149) Avail: NTIS HC A03/MF A01 CSCL 07D

Specific examples are cited to illustrate the universal needs and demands for thermophysical property data. Applications of the principle of similarity in fluid mechanics and heat transfer and extensions of the principle to fluid mixtures are discussed. It becomes quite clear that no matter how eloquent theories (or experiments) in fluid mechanics or heat transfer are, results of their application can be no more accurate than the thermophysical properties required to transform these theories into practice - or in the case of an experiment, to reduce the data. Present day projects take place on such a scale that the need for international standards groups and mutual cooperation is evident. Author

N79-33342# National Technical Information Service, Springfield, Va.
ALCOHOL FUELS, VOLUME 2. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1978 - Jun. 1979
Diane M. Cavagnaro Jul. 1979 144 p Supersedes NTIS/PS-78/0873 and NTIS/PS-77/0820
(NTIS/PS-79/0713/2; NTIS/PS-78/0873; NTIS/PS-77/0820) Avail: NTIS HC $28.00/MF $28.00 CSCL 21D

Federally-funded research on alcohol based fuels that may be used in the future as a fuel source is presented. Synthesis, chemical analysis, performance testing, processing, pollution, economics, environmental effects, and feasibility are included. One hundred and thirty five abstracts, 109 of which are new entries to the previous edition are reported. GRA

N80-18178# California Univ., Berkeley. Lawrence Berkeley Lab.
AGGREGATED VECTORIAL MODEL OF PETROLEUM FLOW IN THE UNITED STATES
V. V. Krishnan and D. F. Cahn Mar. 1979 90 p refs
(Contract W-7405-eng-48)
(LBL-8874) Avail: NTIS HC A05/MF A01

An aggregated material-flow model is proposed for crude oil and its derivative products. Stages in petroleum flow where material conservation is expected are isolated from those where volumetric or identity changes can occur, and generic properties of petroleum and petroleum products that would assist in effective data validation are identified. The model provides a structural framework for organization and consolidation of the various data bases related to petroleum, and serves as a guide for analysis and enumeration of explicit semantic data interrelationships. The model is amenable to expansion into both transactional and more disaggregated representations. The material-flow model is intended as a preliminary step toward a coherent and comprehensive data structure to support monitoring, forecasting, and regulatory efforts in the energy field. The model is developed in the abstract; no attempt is made to test it using explicit data. DOE

N80-23478# Ogden Air Logistics Center, Hill AFB, Utah. Propellant Lab Section.
PROPELLANT SURVEILLANCE REPORT LGM-30 A AND B STAGE 1, TP-H1011
John A. Thompson Nov. 1979 110 p
(AD-A081493; MANCP-425(79)) Avail: NTIS HC A06/MF A01 CSCL 21/9

This report contains propellant test results from cartons of TP-H1011 bulk propellant representing LGM-30 A and B First Stage Minuteman Motors. Testing was accomplished in accordance with MMWRM Project MB2934C-WNL17514. The purpose of testing was to determine and provide early warning of any serious degradation trends in the propellant for service life predictions. An analysis of all parameters indicates that no potential problems are expected in the propellant for at least two years past the oldest data point. Data stored in the GOBS System were plotted utilizing the IBM 360-65 Computer and CAL-COMP Plotter. The data range at any age can be found by suitable inquiry of the GOBS System. Each point on the regression plot represents the mean of all samples at that particular age. The number of specimens at each point is indicated on the sample size summary sheet accompanying each regression plot or group of regression plots. GRA

N80-27808# Mitre Corp., Bedford, Mass.
A TEST PLAN FOR THE NEPSCO COAL-OIL MIXTURE COMBUSTION PROJECT
Oliver K. Foo, Edward M. Jamgochian, and Alberto J. Sabadell *In* Pittsburgh Energy Technol. Center The 2d Intern. Symp. on Coal-Oil Mixture Combust., Vol. 1 1979 32 p refs

Avail: NTIS HC A25/MF A01

Test objectives include the collection of technical and economic data to evaluate system performance, operability/maintainability, availability/reliability, and costs. A continuous 12 month test period was established. Superimposed on this period are four structured test periods during which the boiler load will be maintained at preselected levels while performance tests on the preparation plant and boiler are conducted. The end use of the data collected will provide a technical and economic data base to satisfy regulatory requirements and contribute to the commercialization of CDM technology. E.D.K.

N80-29603# Ogden Air Logistics Center, Hill AFB, Utah. Propellant Lab. Section.
PROPELLANT SURVEILLANCE REPORT LGM-30 F AND G STAGE 1, PHASE G. SERIES 8, TP-H-1011 Semiannual Report
John A. Thompson Apr. 1980 135 p refs
(AD-A085630; MANCP-438(80)) Avail: NTIS
HC A07/MF A01 CSCL 21/8

This report contains propellant test results from cartons of TP-H1011 bulk propellant representing LGM-30 F and G First Stage Minuteman Motors. This report uses a statistical approach to analyze the bulk carton propellant data. Testing was accomplished in accordance with MMWRM Project M0404BC-WNLO1529. The data from this test period are combined with data from previous testing and entered into the GOBS computer for storage, analysis and regression analysis. From the statistical analysis of all data tested to date (fourteen years for F and G), significant degradation of the propellant does not appear likely for at least two years past the oldest data point. Each point on the regression plot represents the mean of all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot or group of regression plots. The data range at any age can be found by suitable inquiry of the GOBS system. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

A76-37699 # **Thermophysics in the Air Force Research and Exploratory Development Program.** M. L. Minges (USAF, Materials Laboratory, Wright-Patterson AFB, Ohio). *American Institute of Aeronautics and Astronautics, Thermophysics Conference, 11th, San Diego, Calif., July 14-16, 1976, Paper 76-454.* 11 p. 14 refs.

Attention is focused on major USAF programs in which thermophysics plays a major role, and where thermophysics inputs are required in component and system design. High-temperature properties of solids and composites, particularly in the case of ablation design of re-entry vehicle nosetips, laser devices and laser materials, and the thermal design of satellite optics systems, are dealt with. The picture of rising costs as it affects the research and development climate, the measurements and data base of the programs, and thermal transport properties of such spacecraft-borne materials as biological materials (including foodstuffs) and geological samples are considered. R.D.V.

A77-10479 **A Data Base Management /DBMP/ Program for Integrated Logistics Support /ILS/.** A. Christensen and R. S. J. Voytek (Litton Systems /Canada/, Ltd., Rexdale, Ontario, Canada). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 467-475. 5 refs.

The Integrated Logistics Support function and its interdependent disciplines such as life cycle costing, reliability and maintainability engineering, spares determination and sparing philosophies is discussed in this paper. This inter-relationship is pursued from a Data Base Management Program (DBMP) viewpoint. The (DBMP) can be applied directly to the optimum design and selection of a system of equipment for a sailing vessel, an aircraft, a computer complex or a large orbiting space station. (Author)

A77-40081 **Computer aided process planning.** R. C. Read, Jr. (Bell Helicopter Textron, Fort Worth, Tex.). In: American Helicopter Society, Annual National Forum, 33rd, Washington, D.C., May 9-11, 1977, Proceedings. Washington, D.C., American Helicopter Society, Inc., 1977. 8 p. (AHS 77-33-54)

The Bell Computer Aided Process Planning System is an on-line system designed to maximize the planners productivity and reduce the clerical effort required to prepare and release planning. The system uses the latest in data base technology and is the nucleus of Bell's integrated manufacturing system. Planning is automatically printed by the computer from a response from the Work-In-Process (WIP) System. A 40,000 man-hour savings has resulted in the Traveler Reproduction Department since the CAP System was installed. Planning effort has been reduced by a minimum of 20%. The MENU approach (Modules of Canned Planning) allows the planner to create the entire operations section of the planning from a seven digit code. MENU's also promote standardization and traceability of existing planning. Other areas of manufacturing are also experiencing benefits from CAP such as automatic provisioning of material codes, mechanical generation of assembly requisition bill of materials, part and stock location callouts, raw material requisitions, and more accurate planning. (Author)

A79-19726 # **Utilization of computer techniques in analyzing production trend problems.** H. Schneider (Litton Industries, Guidance and Control Systems Div., Woodland Hills, Calif.). *American Society of Mechanical Engineers, Winter Annual Meeting, San Francisco, Calif., Dec. 10-15, 1978, Paper 78-WA/Aero-16.* 14 p. Members, $1.50; nonmembers, $3.00.

Use of computers to process data of rejections discovered during visual inspection and/or testing is expanding as cost reduction pressures coupled with tighter quality requirements become real elements of the day-to-day business environment of a production line. Many factors contribute to the effectiveness of the output computer reports in providing the desired data. Since the data system itself as well as the downstream analysis of the data is a cost element, the efficiency of a given computer system in pinpointing problems in a timely manner is pertinent to company management. Principles employed and report examples of an 'on-line' multiplant data system which was developed with cost effectiveness as a major element are presented. Although the company's products are electronic systems and plug-in assemblies, the principles are equally applicable to mechanical or electromechanical assemblies subjected to routine visual inspection and/or test. (Author)

N77-[illegible] Wisconsin Univ., Madison.
THE UNDERSTANDING OF MOLECULAR PROPERTIES BY BOTH EXPERIMENTAL AND THEORETICAL METHODS: THE LOCALIZED MOLECULAR ORBITALS OF TRANSITION METAL COMPLEXES, AND THE IONIZATION POTENTIALS OF n-ALKENES Ph.D. Thesis
David Alan Krause 1976 380 p
Avail: Univ. Microfilms Order No. 77-8796

To study the bonding properties of CO as a terminal ligand, the localized molecular orbitals of free CO, cis-$Cr(CO)_2$, $Fe(CO)$, $Ni(CO)$, $Cr(CO)_6$, $Fe(CO)_5$, $Ni(CO)_4$, $Mn_2(CO)_{10}$, and $Co_2(CO)_8$ were obtained by the Boys dipole moment integral and INDO energy localization methods. The Boys method was found to describe the uniqueness of the localized bonding structure more thoroughly than the INDO method. Both methods were then used to compute localized orbitals for several metal - metal bonded molecules, both with and without bridging groups. The compounds studied were $Mn_2(CO)_{10}$, $Co_2(CO)_8$, $Fe_2(CO)_9$, and $Fe_2(CO)_6S_2$. Localized orbitals are less useful in this case because the bond order in the bridging carbonyls is between two and three, but here also, the Boys method was found more useful than the INDO one. The electronic structure of olefins was then investigated. It was found that of the methods investigated, the Fenske-Hall one gave the best correlation with the photoelectron spectral data and is the most useful for the interpretation and understanding of these results. In addition, the effects of chemical structure on these n-alkane ionization potentials were studied. Dissert. Abstr.

N79-13207# National Bureau of Standards, Boulder, Colo. Cryogenics Div.
HELIUM HEAT TRANSFER AND REFRIGERATION IN SUPPORT OF MAGNETIC FUSION ENERGY SYSTEMS
V. Arp, J. A. Brennan, P. J. Giarratano, W. R. Parrish, and W. G. Steward Feb. 1978 140 p
(PB-285231/7; NBSIR-78-877) Avail: NTIS HC A07/MF A01 CSCL 18A

The report is divided into four parts: (1) an assessment of the cryogenic engineering data base used in the MFE community, and recommendations for needed work for that base, (2) experimental progress on measurement of transient helium heat transfer; the data are of importance for magnet stability analysis, (3) presentation of a newly developed general technique for analyzing the efficiency of helium refrigerators of any configuration and thereby identifying sources of inefficiency, and (4) progress towards setting up a data bank on refrigeration system reliability. The technology assessment, item (1), is a revision of a preliminary version dated May 13, 1977, with inclusion of feedback received from both within and outside the MFE community. GRA

N79-18155# Integrated Systems, Inc., Rockville, Md.
A STUDY TO REVIEW FIRE PREVENTION AND CONTROL INNOVATIONS AND NEW TECHNOLOGIES DEVELOPED BY FEDERAL AGENCIES SINCE JANUARY 1, 1971. VOLUME 1 Final Report
M. A. Johnson, J. L. Bryan, J. W. Fothergill, and E. B. Doubberly 30 Nov. 1977 110 p refs
(Contract NFPCA-6-35590)
(PB-287381/8; Rept-OBA78000375) Avail: NTIS HC A06/MF A01 CSCL 13L

Within the constraints of the contract, an exhaustive effort was performed. A total of 3800 questionaires were mailed to potential contacts within the Federal establishment. Approximately 2900 documents of various forms were abstracted, cataloged, and entered into the computer compatible information base. About 1800 documents were acquired for a collection. GRA

N79-18156# Integrated Systems, Inc., Rockville, Md.
A STUDY TO REVIEW FIRE PREVENTION AND CONTROL INNOVATIONS AND NEW TECHNOLOGIES DEVELOPED BY FEDERAL AGENCIES SINCE JANUARY 1, 1971. VOLUME 2: THESAURUS Final Report
M. A. Johnson, J. L. Bryan, J. W. Fothergill, and E. B. Doubberly 30 Nov. 1977 232 p
(Contract NFPCA-6-35590)
(PB-287382/6; Rept-OBA78000376) Avail: NTIS HC A11/MF A01 CSCL 13L

The thesaurus was prepared as a supportive tool for the computer-compatible information base developed for the study of fire prevention and control innovations and new technologies. It was used in the abstracting and citation operation. The thesaurus in combination with the computer-compatible information base and an adequate computerized information system will allow a user to construct keyword search profiles to retrieve all citations of interest in a given field of fire prevention and control. GRA

N79-18157# Integrated Systems, Inc., Rockville, Md.
A STUDY TO REVIEW FIRE PREVENTION AND CONTROL INNOVATIONS AND NEW TECHNOLOGIES DEVELOPED BY FEDERAL AGENCIES SINCE JANUARY 1, 1971. PART 1: COMPENDIUM Final Report
M. A. Johnson, J. L. Bryan, J. W. Fothergill, and E. B. Doubberly 30 Nov. 1977 799 p
(Contract NFPCA-6-35590)
(PB-287383/4; Rept-OBA78000377) Avail: NTIS HC A99/MF A01 CSCL 13L

Literature citations are presented with abstracts of approximately 2900 documents that were cataloged and abstracted. The primary goal of the project was to create a resource data base on Federally-sponsored work and to identify high value candidate technological and/or innovative work that could be immediately employed to improve fire safety. Approximately 3800 solicitations for information on such work were mailed over the course of the project in addition to an extensive literature search. GRA

N79-18158# Integrated Systems, Inc., Rockville, Md.
A STUDY TO REVIEW FIRE PREVENTION AND CONTROL INNOVATIONS AND NEW TECHNOLOGIES DEVELOPED BY FEDERAL AGENCIES SINCE JANUARY 1, 1971. PART 2: COMPENDIUM KEY WORD LISTING Final Report
M. A. Johnson, J. W. Fothergill, J. L. Bryan, and E. B. Doubberly 30 Nov. 1977 329 p
(Contract NFPCA-6-35590)
(PB-287384/2; Rept-OBA78000378) Avail: NTIS HC A15/MF A01 CSCL 13L

The Key word is listed with cross references to document numbers that appear as citations with abstracts in Part 1. It is essentially a key work index to about 2900 documents resulting from federally sponsored projects. GRA

N79-17200# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN ANALYSIS OF FIRE INCIDENTS IN MILITARY AIRCRAFT HANGERS: THE COMPUTERIZED DATA BASE, AN EFFECTIVE TOOL M.S. Thesis
James F. Kennedy and David R. Thomas Sep. 1978 77 p refs
(AD-A061334; AFIT-LSSR-17-78B) Avail: NTIS HC A05/MF A01 CSCL 13/12

This thesis analyzes an existing United States Navy computerized data base of fire incidents in aircraft hangers to demonstrate the usefulness of such a data base as a management tool and also the need for a similar data base in the United States Air Force. The analysis is accomplished using the Statistical Package for Social Sciences (SPSS) program to perform frequency, crosstabulation and breakdown operations on the data base. The authors concluded that the effective assessment of fire loss potential and the justification of existing or proposed fire protection policy could be greatly enhanced by information on the frequency, causes, and behavior of historical fire incidents.
Author (GRA)

N79-18078*# Little (Arthur D.), Inc., Cambridge, Mass.
PROBABILISTIC ANALYSIS OF AIR CARRIER ACCIDENTS
In its An Assessment of the Risks Presented by the Use of Carbon Fiber Composites in Com. Aviation Jan. 1979 p 61-90 refs
Avail: NTIS HC A19/MF A01 CSCL 13L

In order to estimate the potential risks due to carbon fibers (CF) released from aircraft accidents, it was necessary to quantify the probability of an accident or incident at a major hub airport. This probability was contingent upon various conditions surrounding the incident including the phase of operation, aircraft type, and the weather conditions. The type of accident predicted was categorized according to its location relative to the runway and the severity of damage sustained. The methodology utilized to estimate the probability of a specific type of accident is outlined and the various models that were developed in the course of this work are described. G.Y.

N79-21234# Georgia Inst. of Tech., Atlanta.
REPORT ON FIRE DATA COLLECTION AND PRESENTATION
Ronald L. Rardin and Morris Mitzner Jun. 1978 33 p refs
(Grant NFPCA-78023)
(PB-288829/5) Avail: NTIS HC A03/MF A01 CSCL 13L

The national fire data collection and classification systems of several countries are examined, including: Austria, Belgium, Canada, France, Japan, Netherlands, Norway, Sweden, United Kingdom, and the United States. Possible standards are identified for five dimensions of fire experience: type of incident, types of fire loss measures, type of occupancy, area of fire origin, and cause of fire. There is, therefore, in the existing commonality of several data elements, a basis for international fire reporting standards. GRA

N80-13315# Committee on Science and Technology (U. S. House)
STANDARD REFERENCE DATA PROGRAM AUTHORIZATION
Washington GPO 1978 98 p refs Hearing before Subcomm on Sci., Res., and Technol. of the Comm. on Sci. and Technol., 95th Congr., 2d Sess., 9 Feb. 1978
(GPO-25-887) Avail: Subcomm. on Sci., Res. and Technol

Testimonies delivered and statements received in support of the standard reference data program are presented. R.E.S.

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking*.

A75-10402 **The simulation data base - Describing the world to the computer.** W. M. Bunker (General Electric Co., Daytona Beach, Fla.). In: Summer Computer Simulation Conference, Houston, Tex., July 9-11, 1974, Proceedings. Volume 1. Montvale, N.J., AFIPS Press, 1974, p. 32-45. 9 refs.

Discussion of the numerical description, called the 'data base', that is used for computer simulation of a hypothetical world (frequently representing a portion of the actual world) in which the simulation exercise is being conducted. What is simulated may be radar display, 'out-the-window' visual scenes, displays from scanning infrared sensors, and displays from low light level television sensors. Decisions regarding data base preparation and use are shown to be a significant part of the simulation system design process and to have a major impact on the realism of the resulting simulation, as well as on the system flexibility and adaptability to a variety of uses. Special attention is given to major aspects of data processing, data compression, and data base validity requirements. M.V.E.

A75-34878 **A comparison of millimeter wave and optical technologies for intrabase communications.** T. L. Duffield, W. L. Elden, H. B. Muench, and W. Bushunow (Martin Marietta Aerospace, Orlando, Fla.). In: Inventing the model of the future; Proceedings of the Southeast Region 3 Conference, Orlando, Fla., April 29-May 1, 1974. New York, Institute of Electrical and Electronics Engineers, Inc., 1974, p. 268-270.

The capabilities of the millimeter and optical communications systems are compared to define the state of the art and to determine the weak areas in each technology. The study is based on the requirements of rapidly deployed command posts composed of several hundred subscribers and several terminals. A hypothetical base communications network is formulated, based on present and 1980 base communications requirements. Each individual communications link is analyzed and the optimum overall system is selected from the two technologies. The results indicate that short-range/low-data-rate individual communication links are more effective when implemented with optical techniques, whereas millimeter wave techniques are better for long-range/high-data-rate links. S.D.

A76-15882 * **Prediction methods for rain attenuation statistics at variable path angles and carrier frequencies between 13 and 100 GHz.** J. Goldhirsh (Johns Hopkins University, Laurel, Md.). *IEEE Transactions on Antennas and Propagation*, vol. AP-23, Nov. 1975, p. 786-791. 7 refs. NASA Order S-50748-A.

A77-14708 * **Path attenuation statistics influenced by orientation of rain cells.** J. Goldhirsh (Johns Hopkins University, Laurel, Md.). *IEEE Transactions on Antennas and Propagation*, vol. AP-24, Nov. 1976, p. 792-799. 10 refs. Contract No. NOPR-S50748A.

The influence of path azimuth on fade and space diversity statistics associated with propagation along earth-satellite paths at a frequency of 18 GHz is examined. A radar rain reflectivity data base obtained during the summer of 1973 is injected into a modeling program and the attenuation along parallel earth-satellite paths are obtained for a conglomeration of azimuths. Statistics are separated into two groupings: one pertaining to earth-satellite paths oriented in the northwest-southeast and the other in the northeast-southwest quadrants using a fixed elevation angle of 45 deg. The latter case shows fading to be greater with a degraded space diversity suggesting rain cells to be elongated along this direction. Cell dimensions are analyzed for both sets of quadrants and are found to have average values larger by 2 km in the northeast-southwest quadrants; a result consistent with the fade and space diversity results. Examination of the wind direction for the 14 rain days of data analyzed shows good correlation of the average or median wind directions with the directions of maximum fading and degraded space diversity. (Author)

A78-32880 # **Development of traffic scenarios for the future Intelsat system.** H. L. Van Trees, J. P. Casey, T. S. Chidambaram (Communications Satellite Corp., Washington, D.C.), R. Parthasarathy, and H. Chasia (International Telecommunications Satellite Organization, Washington, D.C.). In: Communications Satellite Systems Conference, 7th, San Diego, Calif., April 24-27, 1978, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1978, p. 29-37. 6 refs. Research sponsored by the International Telecommunications Organization. (AIAA 78-530)

Consideration is given to the development of traffic scenarios for the Intelsat system for the post Intelsat-V time frame (1980-1993). Emphasis is on the development of the Integrated Traffic Data Base which could provide the core for the nominal growth scenario for future user requirements. Perturbations of an established nominal scenario may be produced by judicious application of the conventional services model, the connectivity model, and/or the new services model. The conventional servites model provides a means for defining an optimistic/pessimistic range around a given nominal scenario; the connectivity model is intended to contribute additional information concerning the introduction of new links and new ground stations into the system beyond that indicated by the Integrated Traffic Data Base; the new services model is capable of augmenting the entire conventional services picture by yielding traffic forecasts relating to potential new Intelsat service offerings. B.J.

A78-32881 # **Intelsat's orbital and spectral needs in the 1980's.** S. B. Bennett (International Telecommunications Satellite Organization, Washington, D.C.). In: Communications Satellite Systems Conference, 7th, San Diego, Calif., April 24-27, 1978, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1978, p. 38-42. (AIAA 78-531)

Based on studies of traffic growth and service requirements, it is concluded that Intelsat will need additional frequency spectrum allocations in the 1980's. Techniques for the efficient utilization of new spectrum allocations to the fixed-satellite services are discussed. Principles that should be applied in defining new frequency spectrum allocations and specific allocations consistent with these principles are proposed. The associated present and future orbital locations for Intelsat satellites are identified. Finally, the present ITU intersystem coordination procedures seem to neither promote efficient use of the geostationary orbit nor to provide adequate interference protection in the real world of inhomogeneous systems. Intelsat's coordination guidelines and interference criteria, developed to overcome these shortcomings, are summarized. (Author)

A79-15673 **MTI radar.** Edited by D. C. Schleher (Raytheon Co., Wayland, Mass.). Dedham, Mass., Artech House, Inc., 1978. 506 p. $34.

The present volume brings together much of the significant material available on MTI radars. The introduction gives a brief history of MTI, describes the different types of MTI, traces the evolution of MTI hardware, and introduces definitions and terminology. A glossary of MTI terms is presented. The outline of MTI theory provides a compilation of significant formulas for the design and analysis of MTI radars; several of the formulas on transversal filters and FFT digital filters are new. The section on clutter models and data is intended to supplement and permit interpretation of the extensive existing radar clutter data base. The Gaussian clutter assumption used throughout the reprinted papers leads to an optimum linear MTI processor. Digital MTI, airborne MTI, and MTI hardware are also discussed. S.D.

A79-50337 **The United States Air Force electromagnetic compatibility/intrasystem analysis program /EMC/IAP/ support center.** G. T. Capraro and J. C. Brodock (USAF, Rome Air Development Center, Griffiss AFB, N.Y.). In: Learning to use our environment; Proceedings of the Twenty-fifth Annual Technical Meeting, Seattle, Wash., April 30-May 2, 1979. Mount Prospect, Ill., Institute of Environmental Sciences, 1979, p. 112-118. 31 refs.

The functions of the United States Air Force Electromagnetic Compatibility/Intrasystem Analysis Program (EMC/IAP) Support Center are presented and its purposes are discussed. The EMC/IAP is outlined, and programs contained within this collection of mathematical models developed to aid in the electromagnetic compatibility analysis of Air Force weapons systems are described. The support center provides a means of technology transfer from Air Force research and development laboratories to the user community, with a means of user-generated feedback to aid in the development of the best possible analysis tools. The EMC/IAP Support Center will be responsible for the distribution of all codes and associated software, the education of new and old users, the updating and maintenance of all software, the testing and integration of new models into the EMC/IAP, the maintenance of generated-system data bases and user support. A.L.W.

A80-44271 * **Comparison of radar derived slant path rain attenuations with the COMSTAR beacon fades at 28.56 GHz for summer and winter periods.** J. Goldhirsh (Johns Hopkins University, Laurel, Md.). *IEEE Transactions on Antennas and Propagation*, vol. AP-28, July 1980, p. 577-580. Contract No. NDPR-S401138.

An experiment for testing and improving the accuracy of radar derived slant path attenuations of a 28.56-GHz COMSTAR beacon signal is described. The results of an additional data base consisting of five rain days during fall-winter periods of 1978-1979 are considered, over which 715 min of simultaneous radar and disdrometer data were obtained. V.T.

N75-23827# National Oceanic and Atmospheric Administration, Boulder, Colo. Space Environment Lab.

A 1964 DIGITAL DATA BASE FOR IONOSPHERIC MODELING. PART B: INCOHERENT SCATTER RADAR RESULTS

G. M. Lerfald and R. B. Jurgens Oct. 1974 41 p refs Prepared in cooperating with EPA, Research Triangle Park, N.C.
(COM-75-10199/8; NOAA-TM-ERL-SEL-38; NOAA-75012405)
Avail: NTIS

The Millstone Hill (Massachusetts) Thomson scatter results for March, April, June, September, and December of 1964 are assembled in digital form. These digital results are archived on magnetic tape. The density and temperature profiles extend from 90 to 1000 km. The profile results are digitized as observed over the height range from 200 km to 700 km. Monthly mean values are introduced, along with a model for the underlying ionization, to extend the lower portion of the density profiles. An exponential extrapolation extends the density profiles at the higher heights. The electron and ion temperature profiles are extended to lower and higher heights, to be consistent with the neutral atmosphere as given by the model of Jacchia. GRA

N76-15350# Center for Naval Analyses, Arlington, Va. Operations Evaluation Group.

MESSAGE CODING

Thomas L. Oberlin Apr. 1975 94 p ref
(Contract N00014-68-A-0091-0012)
(AD-A014581; CRC-279) Avail: NTIS CSCL 17/2

Shortcomings of the Standard Subject Identification Code (SSIC) are identified, and its performance is compared with that of an alternate subject code. Potential uses of the extra information that a good subject code provides are developed, as is methodology for evaluating message codes. GRA

N76-29450# Army Communications Systems Agency, Fort Monmouth, N.J.

DTEP (DIGITAL TRANSMISSION EVALUATION PROJECT) Annual Report, 1975

5 Feb. 1976 15 p
(AD-A022343) Avail: NTIS CSCL 17/2

The engineering evaluation project was established to derive an engineering data base in the area of wideband digital communication by testing and evaluating selected commercially developed communication equipment. This project provides the Defense Communications Agency (DCA), Department of the Army, and other MILDEPS information to guide modernization towards an all digital communication system. An engineering data base is being developed by conducting tests in both back-to-back (laboratory environment) and dynamic (over the air) configurations. This knowledge can then be used in the preparation of technical specifications, Military Standards, and for solving special problems. The purpose of this report is to provide a synopsis of significant effort which occurred on the DTEP during calendar year 1975. Topics discussed are management, manpower, funding and a technical analysis of equipments and techniques. GRA

N76-31384# Ediew, Inc., San Francisco, Calif.

SEAFARER SITE SURVEY, NEVADA REGION, BOOK 2 Final Report

22 Dec. 1975 375 p refs Prepared for GTE Sylvania, Inc., Needham Heights, Mass.
(Contract N00039-75-C-0309)
(AD-A021019) Avail: NTIS CSCL 17/2

The objective of the study is to provide a comprehensive environmental data base portraying all physical, biological, and socioeconomic factors that should be considered in assessing the impact of the proposed SEAFARER system on the environment. The data presented will serve two major purposes: (1) a basis for preparation of the Environmental Impact Statement and (2) input for final system design and siting. The Site Area is defined as the area encompassing the Tonopah Test Range, the Nellis Bombing Range, and the Nevada Test Site. It includes approximately 4,256 square miles. The region of interest is generally defined as the four-county region including Clark, Lincoln, Nye, and Esmeralda Counties. The environmental data have been grouped into a series of sixteen distinct data categories. GRA

N76-31385# Ediew, Inc., San Francisco, Calif.

SEAFARER SITE SURVEY, NEW MEXICO REGIONS, BOOK 3 Final Report

22 Dec. 1975 425 p refs Prepared for GTE Sylvania, Inc., Needham Heights, Mass.
(Contract N00039-75-C-0309)
(AD-A021020) Avail: NTIS CSCL 17/2

The objective of the study is to provide a comprehensive environmental data base portraying all physical, biological, and socioeconomic factors that should be considered in assessing the impact of the proposed SEAFARER system on the environment. The data presented will serve two major purposes: (1) a basis for preparation of the Environmental Impact Statement, and (2) input for final system design and siting. The Site Area encompasses the White Sands Missile Range and portions of the Fort Bliss Military Reservation. The site includes approximately 4,000 square miles. The region of interest is generally defined as the five-county New Mexico region including Socorro, Lincoln, Sierra, Dona Ana, and Otero Counties, plus the El Paso metropolitan area in western Texas. The environmental data have been grouped into a series of sixteen distinct data categories. GRA

N77-12271# Massachusetts Inst. of Tech., Cambridge.
LOW COST DATA AND TEXT COMMUNICATION FOR THE LESS DEVELOPED COUNTRIES: A STUDY WITH SPECIAL REFERENCE TO THE NEEDS OF THE INTERNATIONAL AGRICULTURAL RESEARCH CENTERS
Ithiel DeSola Pool, Eliot Freedman, and Colin Warren Jan. 1976 150 p
(PB-256067/0) Avail: NTIS HC A07/MF A01 CSCL 17B

High technology systems of data communication including facsimile, computer polling systems, packet switching, and multiple access satellite systems are manageable in, and appropriate to the needs of the less developed countries. Use of such technologies can (1) markedly reduce costs for some important services; (2) locate activities in those centers where adequate maintenance and technical personnel exists; and (3) give the LDC's access to the best and most advanced technical information bases.
GRA

N77-14314# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
TROPOSPHERIC EFFECTS ON SIGNALS AT LOW ELEVATION ANGLES
Helen S. Hopfield Mar. 1976 42 p refs
(Contract N00017-72-C-4401)
(AD-A025714; APL/JHU/TG-1291) Avail: NTIS HC A03/MF A01 CSCL 17/2

Two possible sources of error in computing a tropospheric range correction from a model are mismatch between the model and the actual refractivity profile, and neglect of a signal path bending. To study the error sources, the tropospheric range effect on a radio signal has been evaluated at different elevation angles, for some observed atmospheres, by three methods: (a) using meteorological balloon data, the effect is evaluated along the computed, curved signal path (this is our best estimate of the true effect and is the standard for comparison); (b) using meteorological balloon data, the effect is evaluated for assumed straight-line propagation, and (c) using only surface meteorological data, the effect is evaluated from the two-quartic tropospheric model for assumed straight-line propagation. The differences ((b) - (a)) and ((c) - (b)), respectively, represent the path-bending component and the profile-mismatch component of the total model error ((c) - (a)). Results are presented in figures. The effect of the model-based correction on the computation of tracking-station position is shown for a few sample cases. Author (GRA)

N77-15251# Technology Service Corp., Santa Monica, Calif.
SYNTHETIC APERTURE RADAR APPLICATIONS STUDY Final Technical Report, May 1975 - Jan. 1976
Michael R. OSullivan and J. W. Ball Griffiss AFB, N. Y. RADC Apr. 1976 121 p refs
(Contract F30602-75-C-0182; AF Proj. 3201)
(AD-A026969; TSC-PD-B482-1; RADC-TR-76-114) Avail: NTIS HC A06/MF A01 CSCL 17/9

The purpose of this effort was to study the feasibility and methods of extracting DRLMS data base parameters from SAR imagery. It was concluded that much of the required DRLMS data exists in SAR imagery which can be extracted using an interactive system. A set of procedures and a conceptual design of an interactive system were developed for use in the extraction process. The outstanding questions concern metric accuracy, the efficiency of the overall system, and the amount of feature information image interpreters can extract. Author (GRA)

N77-21299# E-Systems, Inc., Dallas, Tex.
STORED FORMAT AUTOMATED COMMUNICATION TERMINAL (STORFACT) Final Technical Report, 25 Apr. 1975 - 12 May 1976
J. G. Carr and A. R. Etheredge Griffiss AFB, N. Y. RADC Aug. 1976 34 p
(Contract F30602-75-C-0218)
(AD-A031976; RADC-TR-76-263; Rept-416-04158) Avail: NTIS HC A03/MF A01 CSCL 17/2

STORFACT is an alternate input/output device for the AN/UYA-7 (V) Communications Terminal. STORFACT utilizes a solid state, Plasma Discharge Display module capable of displaying up to 256 characters. Associated with the display is a memory capable of holding four 256 character pages (1,024 characters). The STORFACT System provides up to nine selectable, predetermined formats, including one for free text. This is accomplished by means of removable, reprogrammable Read Only Memories (ROM's). A tenth format is provided by a Random Access Memory (RAM). Formats are protected such that keyboard entry of data into a non-variable position is impossible. Formats, including variable data, are limited to 512 characters. Comments may be added to the end of a format message to make a total of 1,024 characters. All 1,024 characters are not necessarily transmitted. Editing may be accomplished by write-over of any character of variable data. Received messages are stored in a separate 1,024 character memory so that receipt of a message will not interfere with message composition. Author (GRA)

N77-21312# Army Communications-Electronics Engineering Installation Agency, Fort Huachuca, Ariz.
DEB STAGE 1 CONUS LINK TESTING Interim Report, May - Sep. 1976
John J. McDonnell, Edward New, and Stephen T. Schoch 29 Oct. 1976 45 p
(AD-A032721; CCC-CED-76-OTEP-014) Avail: NTIS HC A03/MF A01 CSCL 17/2

CONUS link testing was initiated to establish a data base and performance assessment of a similar microwave system in advance of the final implementation of the DEB Stage-1 program. Six AN/FRC 162 radios, two AN/FRC 165 radios, and ten T1-4000 multiplexers were used to establish four terminals with the capability of propagating over eight paths, one of which had a length of 82 miles. Mathematically predicted fade margins were not realized. A large difference was noted in the number of fades recorded at each terminal receiver, over one path. A noteworthy number of fade rates in excess of 70 dB/second was observed, and over 0.5% of recorded fade depths were 30 dB or greater. Except for four dropouts, the long term BER for the 82-mile link was 1.4 x 10 to the minus 12th power. The BER was 1.85 x 10 to the minus 8th power after eight transmission links of baseband repeaters, but with a 10 dB fade margin. Variability among multiplexer sensitivities was important in determining the distribution of errors in the baseband repeater tests. Author (GRA)

N77-23295*# Comsat Labs., Clarksburg, Md.
PRECIPITATION-ATTENUATION STUDIES BASED ON MEASUREMENTS OF ATS-6 20/30-GHz BEACON SIGNALS AT CLARKSBURG, MARYLAND Final Report, May 1974 - Dec. 1975
D. J. Fang and J. M. Harris Aug. 1976 97 p refs
(Contract NAS5-20740)
(NASA-CR-152501; CLP-74-110) Avail: NTIS HC A05/MF A01 CSCL 20N

Radiometric sky temperature and minute precipitation measurements were intended to broaden the data base required to advance the understanding of the propagation characteristics of the earth-satellite path at frequencies over 10 GHz. Analyses of the data collected from the measurement program have established a detailed correlation between the satellite signal and the signals from auxiliary ground-based measurements. The indirectly derived statistics agreed reasonably well (or can be reconciled) with the earlier published results. The correlations may therefore be used for indirectly estimating long term cumulative attenuation statistics in the absence of direct satellite signal measurements. Author

N77-27780# Naval Electronics Lab. Center, San Diego, Calif.
ELECTROMAGNETIC SYSTEM INTERACTION ALGORITHMS SEMCA, IPM, TRED, AND COSAM ARE COMPARED WITH RESPECT TO MODELING PHILOSOPHY, FLEXIBILITY, DATA BASE, NOISES AND INTERFERENCES, INTERFERENCE THRESHOLD CRITERIA, ATTENUATION MODELING AND ANTENNA COUPLING, AND PRINTOUTS
S. T. Li 3 Jan. 1977 62 p refs

(XF54585004)
(AD-A037903; NELC-TD-506) Avail: NTIS HC A04/MF A01
CSCL 20/14

TRED is a system design tool while SEMCA, IPM, and COSAM are mainly used as interference prediction tools. A user-computer interactive program is recommended. It would be based on the TRED design philosophy and would be used during the design stage of shipboard RF communication systems. In addition, a performance evaluation program for shipboard RF communication systems is recommended. The purpose of the evaluation is to predict final system performance in terms of articulation index and bit error rate. Author (GRA)

N77-28347# Electromagnetic Compatibility Analysis Center, Annapolis, Md.

A MODEL TO PREDICT MUTUAL INTERFERENCE EFFECTS ON AN AIRFRAME Final Report

Priscilla A. Dwyer (IIT Research Inst., Annapolis, Md.) Oct. 1976 157 p refs
(Contract DOT-FA70WAI-175)
(AD-A038224/1; ECAC-PR-76-087; FAA-RD-76-50) Avail: NTIS HC A08/MF A01 CSCL 09/3

An analysis model has been developed to determine the mutual interference effects of introducing new avionics equipment to an existing airframe, containing operational equipment. The model has been updated, improved, and expanded in a series of scheduled efforts. Those improvements are summarized and the current version of the model is completely documented. Author

N77-31394# Speech Communications Research Lab., Inc., Santa Barbara, Calif.

ACOUSTIC/LINGUISTIC ASPECTS OF AUTOMATIC SPEECH RECOGNITION Interim Report, 1 Jan. - 31 Dec. 1976

David J. Broad and Larry L. Pfeifer 18 Apr. 1977 14 p
(Contract F44620-74-C-0034)
(AD-A040332; AFOSR-77-0631TR) Avail: NTIS HC A02/MF A01 CSCL 09/4

The following work was accomplished during this contract year: (1) Implementation of programs and procedures for storing labels which contain descriptive information about speech events, thereby permitting sorting and retrieval of speech sounds based upon certain qualities or characteristics; (2) Implementation of an automatic procedure for screening data for the purpose of locating potentially erroneous samples in a large data base; (3) Formulation of an automatic boundary detection algorithm which is useful for locating the boundaries between speech sounds; and (4) Formulation of an automatic steady-state detection algorithm which locates and labels the most stable interval of a speech sound. GRA

N78-12282# Speech Communications Research Lab., Inc., Santa Barbara, Calif.

FEATURE ANALYSIS FOR SPEAKER IDENTIFICATION Final Report

Larry L. Pfeifer Aug. 1977 93 p refs
(Contract F0802-76-C-0157)
(AD-A044311; RADC-TR-77-277) Avail: NTIS HC A05/MF A01 CSCL 06/7

A method for text-independent speaker identification has been developed which utilizes vowel sounds as the basis for extracting speaker characteristics. The use of this approach typically requires that vowel samples first be classified according to vowel category, so that vowels of the same category can be compared in the speaker identification process. It has been demonstrated, however, that it is only necessary to detect vowel-like sounds in the speech material and that speaker identification performance actually improves when there is no vowel recognition. Another significant outcome of this research was the successful application of sequential analysis to the decision process. The experiments which led to the conclusions of the research were based upon a data base of vowel samples form more than one hour of speech material excerpted from conversational speech recordings. Using the sample 20-speaker reference patterns, tests with data from two speakers recorded two weeks after the reference material showed that one of the speakers was correctly identified in 18 seconds and the second speaker was correctly identified, but with a lower confidence level than the first. GRA

N78-20407# Naval Postgraduate School, Monterey, Calif.

TESSAC ELECTROMAGNETIC COMPATIBILITY SURVEY

Richard W. Adler Sep. 1977 161 p refs
(AD-A050016; NPS-62AB770901) Avail: NTIS HC A08/MF A01 CSCL 20/14

This report provides a summary of the state of technology, the Navy's technical capabilities and the adequacy of specifications and standards relative to electromagnetic compatibility in aircraft and ship platforms. Recommendations for improvement are made. Author (GRA)

N78-23313# Federal Communications Commission, Washington, D. C. Spectrum Allocations Div.

SURVEY OF THE NON-GOVERNMENT MASTER FREQUENCY FILE

Phillip G. Tremper Jan. 1978 64 p refs
(PB-278376/1; FCC/OCE/SA-78/01) Avail: NTIS HC A04/MF A01 CSCL 17B

Random samples were taken from the Safety and Special Radio Services Bureau paper data base (PDB) and compared to records stored in the master frequency file (MFF). Random samples were then taken from the MFF and compared to the licenses stored in the PDB. The surveys demonstrated the percentage completeness of the two data bases and the percent accuracy of each data element within the MFF. Recommendations are given to improve the utility of the MFF and its accuracy for use in frequency assignment. GRA

N78-24394 British Broadcasting Corp., Kingswood (England). Engineering Div.

COMPUTER PROGRAMS FOR VHF INTERFERENCE PREDICTION USING A TERRAIN DATA BANK

J. H. Causebrook and B. Tait Apr. 1978 16 p refs
(BBC-RD-1978/13) Copyright. Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

A set of computer programs was written to aid broadcast service planning work in the VHF bands. They were intended for FM sound in band 2 as well as new television and other possible services in bands 1 and 3. The prime object was the prediction of interference levels from other transmitters into a service area. The methods were an extension of those employed for UHF where terrain and transmitter data banks were used. Author

N78-26381# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.

RADAR IMAGE SIMULATION: VALIDATION OF THE POINT SCATTERING METHOD, VOLUME 2

J. C. Holtzman, V. H. Kaupp, J. L. Abbott, V. S. Frost, and E. E. Komp Sep. 1977 383 p refs
(Contract DAAG53-76-C-0154)
(AD-A053240; RSL-TR-319-Vol-2; ETL-0118-Vol-2) Avail: NTIS HC A16/MF A01 CSCL 17/9

The technical details of all aspects of the radar image simulation are reported. In particular, the activities associated with the Point Scattering Method are discussed. They include (1) construction of a ground truth data base, i.e., the terrain model which incorporates elevation and dielectric behavior, (2) digitization of the terrain information to build a digital matrix, (3) formation of a backscatter data catalogue, (4) radar device modeling, and (5) problems and solutions inherent in image handling and analysis. Author (GRA)

N78-26380# SRI International Corp., Menlo Park, Calif.

CHATANIKA MODEL OF THE HIGH LATITUDE IONOSPHERE FOR APPLICATION TO HF PROPAGATION PREDICTION Final Report, 1 Jan. - 30 Sep. 1977

R. R. Vondrak, G. Smith, V. E. Hatfield, R. T. Tsunoda, and V. R. Frank Jan. 1978 158 p refs
(Contract F19628-77-C-0102)
(AD-A053154; RADC-TR-78-7) Avail: NTIS

HC A08/MF A01 CSCL 17/9

Electron density measurements made with the incoherent-scatter radar at Chatanika, Alaska have been used to obtain a synoptic model of the high-latitude ionosphere. This Chatanika model is a modification of the RADC-POLAR model developed by Elkins and coworkers for use in raytracing codes for HF propagation prediction. Because the existing RADC model was derived from a larger and more geographically extensive data base than that used in this study, many of its features have been retained in the new model. The major modification made was an improved specification of the auroral E-layer and the altitude interval between the E and F regions. This region sometimes acts as a duct in which HF signals may travel for great distances without traversing the D region, where most absorption occurs. GRA

N78-28296# Electromagnetic Compatibility Analysis Center, Annapolis, Md.
FAA REMOTE TERMINAL SYSTEM Final Report
Thomas Hensler (IIT Research Inst., Annapolis) Nov. 1977 103 p refs
(Contracts DOT-FA78WAI-812)
(AD-A054804; ECAC-PR-77-067; FAA-RD-78-8) Avail: NTIS HC A06/MF A01 CSCL 09/3

A system of interactive analysis programs was developed that provides automated, quick-response capabilities for use by frequency managers to solve daily frequency management problems. The system can be used to display records from the FAA Air Traffic Control (ATC) data base, provide electromagnetic compatibility analyses, make frequency assignments, and plot service volumes. G.G.

N78-28314# Rome Air Development Center, Griffiss AFB, N.Y.
PROCEEDINGS OF THE RADC SPECTRUM ESTIMATION WORKSHOP
May 1978 295 p refs Presented at Griffiss AFB, N. Y., 24-26 May 1978
(AD-A054650) Avail: NTIS HC A13/MF A01 CSCL 14/2

This workshop provided a means for key researchers in the field to describe their work and also provided a means for comparing the work of various researchers using a common data base for representative problems of importance to the Air Force. This report is a collection of papers that were submitted for presentation at RADC's Spectrum Estimation Workshop held 24-26 May 1978 at Griffiss Air Force Base, N. Y. 13441. The papers were published as received by RADC and have not been edited. Further, publication of these papers does not represent approval or endorsement by the Rome Air Development Center or the U.S. Air Force. The researchers were also presented with a set of sample problems called the Spectral Estimation Experiment. The object of this experiment was to establish a basis for comparison of the wide variety of techniques available as a function of selected applications on both real and artificial data sets representing specialized problem classes which are of interest to the government. The common data base offers several additional advantages. Three different problems have been formulated by the workshop committee. They fall generally into the areas of radar, pattern recognition and system identification. The detailed description of the problem and the solutions as determined by the many different algorithms employed will be published separately. Author (GRA)

N78-32332# Army Electronic Proving Ground, Fort Huachuca, Ariz.
NOISE AND ITS RELATIONSHIP TO VEHICLE ELECTROMAGNETIC EMISSIONS: FEASIBILITY STUDY
Jun. 1978 179 p refs
(AD-A055674; USAEPG-FR-1065) Avail: NTIS HC A09/MF A01 CSCL 17/2

This report presents the results of a feasibility study of noise and its relationship to vehicle electromagnetic emissions and the resultant effects on communication system performance. Previous efforts in this field are summarized through a series of matrices which identify the advantages, disadvantages, and status of specific noise parameters or models and communication system performance models. The report also identifies areas for future work. Author (GRA)

N79-10316# British Aircraft Corp., Filton (England). Guided Weapons Div.
VHF PROPAGATION PREDICTION WITH PATH PROFILE METHODS
B. K. Lee *In* AGARD Aspects of Electromagnetic Wave Scattering in Radio Commun. Sep. 1978 11 p refs

Avail: NTIS HC A23/MF A01

Propagation prediction models applicable to VHF military type links in West Germany were derived. These related to a static base station located to give good area coverage. The initial stages of the work involved the measurement of propagation losses (and local signal variations) for 830 paths at 3 frequencies, and also the construction of a digitized topographic data base for the area considered. The latter enabled two dimensional path profiles with associated surface features (such as trees and buildings) to be rapidly produced between any two points within the data base area. The measured data were analyzed in conjunction with the associated path profiles to produce prediction models for both the median propagation loss and the local signal variations as functions of the path profile. The standard deviation of prediction error for the former was 7.3 db, while the average standard deviation for the signal distributions for the latter was 2.5 db. J.A.M.

N79-11297# Eurosat S.A., Geneva (Switzerland).
FUTURE PROSPECTS OF DIGITAL COMMUNICATION SERVICES BY SATELLITE, VOLUME 1
Paris ESA Mar. 1978 210 p refs Prepared jointly with Eurospace, Paris
(Contract ESA-2985/76-F-HS)
(ESA-CR(P)-1082-Vol-1) Avail: NTIS HC A10/MF A01

Existing satellite and terrestrial telecommunication systems and digital communication and data transmission networks are reviewed. Specialized communication services such as teleconferencing, broadcasting, tele-education, computer to computer exchange, data base systems, electronic mail, medical applications, reservation systems, crime, and electronic fund transfer are discussed in detail. Results from a survey in Europe on present day trends and potential requirements are presented. It is concluded that for the moment in most cases data transmission services cannot be multiplexed except through telephone trunk lines and that the quantity of traffic for new digital services will remain very negligible, at least up to 1985. ESA

N79-12312# Mitre Corp., Bedford, Mass.
SEEK IGLOO LIFE CYCLE COST MODEL, COST ELEMENT EQUATIONS, VOLUME 1 Final Report
R. A. Moynihan and W. M. Stein Jul. 1978 80 p
(Contract F19628-78-C-0001)
(AD-A057444; MTR-3577-Vol-1; ESD-TR-78-155-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 05/4

An interactive Life Cycle Cost (LCC) Mathematical model with a built-in Sensitivity Analysis capability has been developed for use in the evaluation of proposed designs for the Air Force SEEK IGLOO Radar System. The SEEK IGLOO LCC Model consists of 10 cost elements which describe acquisition costs as well as operation and support costs. This volume presents the equations for these cost elements. Also included is a full discussion of the assumptions made which impact the development of these cost element equations. Author (GRA)

N79-20008# Dialog Systems, Inc., Belmont, Mass.
INTELLIGENCE REPORT VOICE INPUT Final Technical Report
L. Bahler, P. Markey, and S. Moshier Griffiss AFB, N. Y. RADC Nov. 1978 90 p
(Contract F30602-76-C-0257; AF Proj. 4594)
(AD-A062846; RADC-TR-78-239) Avail: NTIS HC A05/MF A01 CSCL 17/2

This work was an initial effort in the use of voice data entry for information data handling. The objective of this effort was to develop the technology for a large vocabulary (1000 word) isolated word recognition system capable of quick adaptation and high accuracy for a limited number of people. Techniques for word boundary detection, noise suppression, and frequency scaling were examined. Tests were conducted on a 1000 word and a 100 word unstructured vocabulary. Recognition accuracies of 30.5% and 68% were obtained for the untrained case and 62.4% and 90% after training each word once. Author (GRA)

N79-24216# Ohio State Univ., Columbus. Electroscience Lab.
FUSELAGE-MOUNTED ANTENNA CODE: USER'S MANUAL
W. D. Burnside, R. J. Marhefka, and E. L. Pelton Jul. 1977 75 p refs
(Contract N62269-76-C-0554)
(AD-A065587; ESL-4583-2; ESL-784583; NADC-79042-30) Avail: NTIS HC A04/MF A01 CSCL 09/5

This manual describes the input and output data associated with the volumetric computer code which has been delivered to the Naval Air Development Center. The input data is defined in general terms and applied to the Boeing 737 aircraft. Numerous examples are included to illustrate the various features of the computer code. Author (GRA)

N79-24281# Federal Communications Commission, Washington, D. C. Spectrum Allocations Div.
AN AUTOMATED RETRIEVAL SYSTEM FOR FREQUENCY ALLOCATION INFORMATION
Joseph V. Casaitis Jan. 1979 70 p ref
(PB-291600/5; FCC/OCE/SAD-79/01) Avail: NTIS HC A04/MF A01 CSCL 17B

The procedure for retrieving frequency allocation information under the control of a computer program is described. There are three seperate data bases containing information from three tables of frequency allocations which may be queried through this retrieval system. The sources for these three data bases are the Federal Communications Commission's (FCC) Rules and Regulations, Volume II, Section 2.106; the International Telecommunications Union (ITU) Radio Regulations, Article 5 (region 2 only); and the Eighth Notice of Inquiry, Appendix 2, Docket 20271 for the 1979 World Administrative Radio Conference (WARC) (Region 2 only). GRA

N79-25280# Shape Technical Center, The Hague (Netherlands).
THE COMBINED US/NATO DIGITAL TROPOSCATTER TEST PROGRAMME OVER TWO ACE HIGH LINKS Final Report
P. Nielsen, J. Osterholz (Defense Commun. Eng. Center), E. Pusone, and I. Vogt Dec. 1978 286 p refs
(AD-A066380; AD-E100189; STC-CR-NICS-38; DCEC-TR-12-78) Avail: NTIS HC A13/MF A01 CSCL 17/2

The combined US/NATO Digital Troposcatter Test Programme was carried out by the Defense Communications Engineering Center (for the US) and the SHAPE Technical Centre (for NATO) between January and August 1977 over two ACE High links in Central Europe which were made available to NATO. The purpose of the tests was to obtain performance data on a multichannel digital troposcatter system using operational communications links. This report contains a description of the equipment and procedures employed, a summary of the results, and the conclusions drawn from the tests. The data obtained has been incorporated in an extensive data base held at both DCEC and STC to provide the capability for future analyses. Author (GRA)

N79-25281# BDM Corp., Albuquerque, N. Mex.
EXEMPT USERS MANUAL Final Report
Jan. 1979 107 p
(Contract F29601-76-C-0122; AF Proj. 3763)
(AD-A066806; AD-E200262; BMA/A-76-140-TR-R2; AFWL-TR-77-207) Avail: NTIS HC A06/MF A01 CSCL 20/14

This volume describes the use of the EXEMPT computer program for the creation, maintenance and modification of a data base to support electromagnetic coupling analysis for linear systems. Use of the EXEMPT Command Language, FORTRAN Mathematical functions, EXEMPT library functions, and data display operations is presented. Interface requirements for user provided subroutines and other programs are defined. Author (GRA)

N79-28386# Speech Communication Research Lab., Los Angeles, Calif.
ACOUSTIC/LINGUISTIC ASPECTS OF AUTOMATIC SPEECH RECOGNITION Final Report
David J. Broad Feb. 1979 39 p refs
(Contract F44620-74-C-0034)
(AD-A068969; AFOSR-79-0525TR) Avail: NTIS HC A03/MF A01 CSCL 17/2

As word-level automatic speech recognition has improved, there has been an increased awareness of the need for more general procedures to recognize extended continuous speech utterances. This project has therefore addressed several problems related to the recognition of continuous speech. This has involved the development of a flexible interactive software system for acquiring, labeling, and analyzing continuous speech. This system has been used to complete most of the other studies reported here, including (1) a statistical procedure for the automatic extraction of reliable formant measures from large-scale data bases, (2) an algorithm for segmenting continuous speech on the basis of spectral change, (3) a study of vowel formant distributions in relation to the inter-speaker normalization problem, (4) various studies of the properties of vowels and consonants, and (5) studies of the prosodic patterns of speech, particularly as they can guide the recognition of extended utterances. Author (GRA)

N79-30422*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
TECHNICAL ASSISTANCE FOR LAW-ENFORCEMENT COMMUNICATIONS: CASE STUDY REPORT
Norman B. Reilly and James A. Mustain 15 Jun. 1979 21 p refs Sponsored in part by Law Enforcement Assistance Admin.
(Contract NAS7-100)
(NASA-CR-162108; JPL-Pub-79-71; Rept-1) Avail: NTIS HC A02/MF A01 CSCL 17B

Methods developed to improve police communications systems are described. Use of queueing analysis shows several ways of improving time of response to inquiries made from the field for license plate checks and for information on current wants and warrants, through a state multiple switcher network. Design criteria for more efficient centralized switching equipment are developed. A message load problem experienced in a dispatch center is analyzed, showing that communications could be improved by adding communications channels, not by adding people. K.L.

N79-30446# Institute for Telecommunication Sciences, Boulder, Colo.
AN ADDITIONAL CATALOG OF PROGRAMS AND DATA

FOR 100 MHz - 100 GHz RADIO SYSTEM PREDICTIONS
Jack T. Collins and F. K. Steele Jan. 1979 43 p
(PB-293366/1; NTIA/Rept-79/15) Avail: NTIS
HC A03/MF A01 CSCL 20N

Analysis aids and data bases for predicting the performance of 100 MHz - 100 GHz communication systems are presented and briefly described. They are loosely grouped into the following functional categories: (1) computations of transmission loss and radar returned power; (2) computations of desired to undesired signal ratios; (3) computations of atmospheric and precipitation parameters; (4) data bases and associated programs; (5) performance of digital communication systems; and (6) miscellaneous programs. Sources are given for the analysis aids, data bases, and additional information. GRA

N79-32466# Federal Communications Commission, Washington, D. C. Data Automation Div.
MICROWAVE APPLICATIONS PROCESSING SYSTEM: A USER'S GUIDE
2 Mar. 1979 100 p Supersedes FCC/DF-77/002A Sponsored by the FCC
(PB-294692/9; FCC/DF-79/003A; FCC/DF-77/002A) Avail: NTIS HC A05/MF A01

The FCC Microwave Applications Processing System (MAPS) is designed to be sufficiently general and flexible to satisfy the diverse requirements of Common Carrier and Safety & Special Radio Services with a common file structure. It contains data on current licenses and on applications, both closed and pending. Data associated with each license or application is subdivided according to function and arranged in a hierarchical set of records. License data is identified primarily by call sign and application data is identified by file number. Each subfile contains cross-referencing information that allows applications to be associated with the appropriate license and vice versa. GRA

N80-18262# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md. Space Dept.
COMPARISON OF RADAR DERIVED RAIN ATTENUATION WITH THE COMSTAR BEACON AT 28.56 GHz FOR SUMMER AND WINTER PERIODS
Julius Goldhirsh Jul. 1979 38 p refs
(Contract N00024-78-C-5384)
(APL/JHU/SIR-79U-016) Avail: NTIS HC A03/MF A01

Results are given pertaining to an experiment whose aims are to test and improve the accuracy of radar derived slant path rain attenuation methods. These estimated results are compared with measured rain fade levels of the COMSTAR beacon signal at 28.56 GHz at Wallops Island, Virginia. The data base corresponds to five rain days flanking the winter of 1978-79 during which 715 minutes of simultaneous radar and disdrometer data were obtained. Agreement between estimated and measured individual rain fade events was found to be generally good. Agreement between corresponding conditional cumulative fade distributions was excellent. The Marshall-Palmer distribution was injected into the radar program and gave similarly good results. The application of the Marshall-Palmer distribution for stratiform type rains as is generally the rain type for winter periods is consistent with the results obtained. M.M.M.

N80-18472*# National Physical Lab., New Delhi (India). Radio Science Div.
LONG TERM SOLAR ACTIVITY AND IONOSPHERIC PREDICTION SERVICES RENDERED BY THE NATIONAL PHYSICAL LABORATORY, NEW DELHI
B. M. Reddy, S. Aggarwal, D. R. Lakshmi, S. Shastri, and A. P. Mitra *In* NOAA Solar-Terrest. Predictions Proc., Vol. 1 Aug. 1979 p 118-133 refs

Avail: NTIS MF A01; SOD HC CSCL 20N

The data base used in solar and ionospheric prediction services is described. Present prediction techniques are discussed and compared with actual observations. Future prediction techniques using computers are also discussed. R.E.S.

N80-18324# Mitre Corp., Bedford, Mass.
COMPUTERIZED MODELS FOR DESIGN AND ANALYSIS OF COMPUTER COMMUNICATIONS SYSTEMS
Carl Tropper May 1979 131 p refs
(Contract F19628-78-C-0001; Proj. 5720)
(AD-A078022; MTR-3864; ESD-TR-79-128) Avail: NTIS HC A07/MF A01 CSCL 17/2

This paper presents a comparison of several models that may be employed for the design and analysis of computer-communications networks. The comparison focuses on the algorithms used for the various facets of network design-routing algorithms, network reliability models, etc. Two models of particular interest have been singled out - one is in the area of protocol design, and the other is an overall network design program. GRA

N80-18361# British Aerospace Dynamics Group, Bristol (England).
SOME OF THE PROBLEMS IN DIGITAL TERRAIN MODEL CONSTRUCTION
G. B. Thersby *In* AGARD Terrain Profiles and Contours in Electromagnetic Wave Propagation Dec. 1979 9 p

Avail: NTIS HC A17/MF A01

Aspects of terrain which may effect electromagnetic wave propagation are identified. Arguments for and against accurate terrain modelling are presented from the point of view of both the user and the software designer. Two possible approaches to digital terrain modelling are outlined as examples and the problems associated with each are discussed. The problems associated with producing a data base which is efficient in terms of computer storage and access times and which comprehensively models the terrain and associated data necessary for advanced propagation prediction modelling techniques are discussed. K.L.

N80-18363# German Military Geophysical Office, Traben-Trarbach (West Germany).
BIOLOGICAL AND GEOPHYSICAL FACTORS OF ELECTROMAGNETIC WAVE PROPAGATION AND THEIR USE IN DIGITAL DATA BANKS
Ekkehard R. Kuesters *In* AGARD Terrain Profiles and Contours in Electromagnetic Wave Propagation Dec. 1979 8 p refs

Avail: NTIS HC A17/MF A01

The development of a radar clutter data bank containing data about elevation and soil cover for the whole Federal Republic of Germany is discussed. The different categories of soil cover are to be correlated with their specific effects on the propagation of electromagnetic waves. The greatest problems in this respect arise with deciduous forest and farmland because of the phenological changes that take place during the year. A phenological observation net was established to obtain data. Since it was impossible to ascertain data for each grid field, a coarse subdivision of the Federal Republic of Germany was made into regions that are homogeneous with respect to the phenological events. Because of the influence of hydrometeors on electromagnetic wave propagation, the data bank also contains data about the altitude, vertical extension, frequency of occurrence, and drop spectra of the major cloud types. K.L.

N80-19365# Joint Radio Committee of the Nationalised Power Industries, London (England).

RADIO NETWORK AND RADIO LINK SURVEYS DERIVED BY COMPUTER FROM A TERRAIN DATA BASE

C. E. Dadson *In* AGARD Terrain and Contours in Electromagnetic Wave Propagation Dec. 1979 17 p refs

Avail: NTIS HC A17/MF A01

A method of deriving calculations for the coverage area of mobile radio networks using a computer and a topographical data base is described. The topographical data base was manually produced from providing 800,000 height reference points at 0.5 kilometer intervals for England, Wales, and Scotland excluding Highlands and Islands. Path profiles are produced by the computer and calculations are provided for each 0.5 km point over the survey area, which can be up to a maximum of 90 km square. The computer requires the user to input details of the base station transmitter location, antenna height, radiated power, and type of antenna. K.L.

N80-19366# Communications Research Centre, Ottawa (Ontario).

VHF/UHF PATH-LOSS CALCULATIONS USING TERRAIN PROFILES DEDUCED FROM A DIGITAL TOPOGRAPHIC DATA BASE

F. H. Palmer *In* AGARD Terrain Profiles and Contours in Electromagnetic Wave Propagation Dec. 1979 11 p refs

Avail: NTIS HC A17/MF A01

A digital topograhic data base comprising some 150,000 sq. km of southern Ontario was established to allow terrain profiles profiles to be constructed automatically. The profiles, together with a variety of terrain surface cover information also derived from the data base, are used in the calculation of path loss, signal strength, and signal to noise ratios for various types of VHF/UHF systems. These calculations incorporate a number of additional factors necessary to achieve good agreement between predicted and measured path losses, including the effects of various types of terrain surface cover and of multiple, nonisolated obstacles. Comparisons of predictions and measurements made over a wide variety of terrain types indicate that rms prediction errors of 4 to 5 bd can be achieved in the VHF/UHF bands.
K.L.

N80-19390# Institute for Telecommunication Sciences, Boulder, Colo.

PERSPECTIVE ON THE PREDICTION OF AURORAL ABSORPTION

Vaughn Agy *In* AGARD Spec. Topics in HF Propagation Nov. 1979 16 p refs

Avail: NTIS HC A25/MF A01

Methods for the calculation of the effects of auroral absorption on high frequency (HF) communication circuits (or HF radar) are briefly described. The riometer is discussed in detail as the best method for establishing an adequate data base for the prediction of auroral absorption effects on HF communication circuits. The reasons to explain why, after 25 years of riometer measurement, there is still no adequate data base are reviewed. Questions remain about the geographic distributions, the temporal variations, and the relationships with polar cap absorption on one hand, and with magnetospheric substorms on the other. These questions are stated and briefly examined. R.E.S.

N80-21576# Selenia S.p.A., Rome (Italy).

THE ORGANIZATION IN A SEMI-AUTOMATIC PROCEDURE OF THE PROGRAMS FOR THE COMPUTER-AIDED DESIGN OF MICROWAVE ANTENNAS

Valeria Caputo and Paolo deVincenti *In* ESA SPACECAD 1979: Computer-Aided Design of Electron. for Space Appl. Nov. 1979 p 153-156

Avail: NTIS HC A19/MF A01

A semiautomatic procedure is presented which allows the flexible management of the programs and of the flow of data between them. Flow charts are presented showing the interactions. An example of the semiautomatic procedure in designing microwave antennas is presented. Author (ESA)

N80-28897# Hughes Research Labs., Malibu, Calif.

INTELLIGENT BANDWITH COMPRESSION Final Report, 1 Nov. 1978 - 31 Jul. 1979

D. Y. Tseng, B. L. Bullock, K. E. Olin, R. K. Kandt, and J. D. Olsen (Hughes Aircraft Co., Fullerton, Calif.) Feb. 1980 115 p refs

(Contract DAAK70-78-C-0148)

(AD-A085184) Avail: NTIS HC A06/MF A01 CSCL 17/2

The feasibility of a 1000:1 bandwidth compression ratio for image transmission has been demonstrated using image-analysis algorithms and a rule-based controller. Such a high compression ratio was achieved by first analyzing scene content using auto-cueing and feature-extraction algorithms, and then transmitting only the pertinent information consistent with mission requirements. A rule-based controller directs the flow of analysis and performs priority allocations on the extracted scene content. The reconstructed bandwidth-compressed image consists of an edge map of the scene background, with primary and secondary target windows embedded in the edge map. The bandwidth-compressed images are updated at a basic rate of 1 frame per second, with the high-priority target window updated at 7.5 frames per second. The scene-analysis algorithms used in this system together with the adaptive priority controller are described. Results of simulated 1000:1 band width-compressed images are presented. A video tape simulation of the Intelligent Bandwidth Compression system has been produced using a sequence of video input from the data base. GRA

N80-33660# European Space Agency, Paris (France).

TELEMATICS AND SATELLITES. PART 1: INFORMATION SYSTEMS

W. R. Burke, ed Jun. 1980 59 p Original contains color illustrations

(ESA-BR-04-Pt-1; ISSN-0250-1589) Avail: NTIS HC A04/MF A01

Telematic systems are identified and described. The applications are examined emphasizing the role played by satellite links. The discussion includes file transfer, examples of distributed processor systems, terminal communication, information retrieval systems, office information systems, electronic preparation and publishing of information, electronic systems for transfer of funds, electronic mail systems, record file transfer characteristics, intra-enterprise networks, and inter-enterprise networks.
Author (ESA)

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

A75-44216 **Maintainability analyses and prototype operations.** J. L. Hesse (U.S. Defense Nuclear Agency, Field Command, Albuquerque, N. Mex.). In: Annual Reliability and Maintainability Symposium, Washington, D.C., January 28-30, 1975, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1975, p. 194-199. 13 refs.

Operations of a large phased array radar prototype are examined as a source of maintainability data. Requirements for data are defined in a system context, and a collection program designed to satisfy them. Analyses of the data obtained yield design feedback as well as an insight into system availability and maintainability. The question of data transferability from the prototype to the production system is addressed, and lessons learned discussed. (Author)

A78-40922 **Intelligent strategy with distributed database for high-volume LSI testing.** C. S. Chi (Sperry Rand Research Center, Sudbury, Mass.). *IEEE Transactions on Instrumentation and Measurement*, vol. IM-27, June 1978, p. 172-178. 12 refs.

A computerized automatic-optimization strategy is developed for high-volume LSI testing on the basis of statistical, cumulative, and time-dependent processes. The system integrates device characterization, collects meaningful data for intelligence test pattern and test sequence production, conducts the on-line incoming test, performs statistical analyses, optimizes test algorithms, and provides the inventory and management of information. The system basically consists of a data management subsystem, a test-pattern and test-sequence generation subsystem, and a host station with distributed interconnections. One hundred CP-1631 LSI chips have been used for testing purposes. It is found that the proposed automatic optimization procedure yields the most effective defect protection in a greatly reduced test time. S.C.S.

A79-30196 # **The Lawrence Livermore Laboratory data base for EMP external coupling - System relatability.** R. M. Bevensee and H. S. Cabayan (California, University, Livermore, Calif.). *(IEEE, DNA, NASA, and DOE, Annual Conference on Nuclear and Space Radiation Effects, 15th, Albuquerque, N. Mex., July 18-21, 1978.) IEEE Transactions on Nuclear Science*, vol. NS-25, Dec. 1978, p. 1428-1435. 11 refs. Contract No. W-7405-eng-48.

This paper describes the external coupling data base prepared by Lawrence Livermore Laboratory for EMP assessment. The data may be used either by electromagnetic specialists or by engineers who may have only limited knowledge of the subject. Data generation by computer code and Transient Electromagnetics Range is described. The modular (generic system) form of the base is outlined, with examples, from a worst-case viewpoint. Validation data for the Range are given. Illustrative simulation test data on a real system are compared to canonical and representative model data. The close agreement validates the links between the real system/canonical model and real system/representative model. Validation from other test data establishes the wide scope of the base for EMP prediction/estimation. (Author)

A79-48880 **A systematic approach to test and fault isolation of digital avionics.** E. C. Lee and C. A. Schmaltz (Westinghouse Electric Corp., Integrated Logistics Support Div., Hunt Valley, Md.). In: AUTOTESTCON '78; International Automatic Testing Conference, San Diego, Calif., November 28-30, 1978, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 142-146.

Testing and fault isolation techniques described provided for a thorough testing of Complex Digital Avionic Systems at actual system clock speeds with a high fault isolation rate. Significantly reduced test and fault isolation time was achieved with input data sequences and response data derived from a data base and tests which are organized into subsystem groups. (Author)

N75-32324*# McDonnell-Douglas Technical Services Co., Inc., Houston, Tex. Consumables Analysis Section.
ELECTRICAL-POWER-SYSTEM DATA BASE FOR CONSUMABLES ANALYSIS. VOLUME 1: ELECTRICAL EQUIPMENT LIST, ACTIVITY BLOCKS, AND TIME LINES
Marvin D. Pipher, P. A. Green, and D. F. Wolfgram 1 May 1975 285 p refs
(Contract NAS9-13970)
(NASA-CR-144459; JSC-09448-Vol-1; JSC-IN-75-FM-14-Vol-1) Avail: NTIS HC $8.75 CSCL 09C

A standardized data base is described which consists of a space shuttle electrical equipment list, activity blocks defining electrical equipment utilization, and activity-block time lines for specific mission analyses. Information is presented to facilitate utilization of the data base, to provide the basis for the electrical equipment utilization to enable interpretation of analyses based on the data contained herein. Author

N75-32325*# McDonnell-Douglas Technical Services Co., Inc., Houston, Tex. Consumables Analysis Section.
ELECTRICAL-POWER-SYSTEM DATA BASE FOR CONSUMABLES ANALYSIS. VOLUME 2: ELECTRICAL EQUIPMENT UTILIZATION
Marvin D. Pipher, P. A. Green, and D. F. Wolfgram 1 May 1975 289 p refs
(Contract NAS9-13970)
(NASA-CR-144460; JSC-09448-Vol-2; JSC-IN-75-FM-14-Vol-2) Avail: NTIS HC $8.75 CSCL 09C

A catalogue is presented of space shuttle electrical equipment as used within a standardized data base for EPS consumables analyses. The general function and expected usage of each type of electrical equipment are described, and the usage of specific equipment of each type in the performance of EPS consumables analyses is defined. Author

N76-22452 Duke Univ., Durham, N.C.
DESIGN OF ENERGY STORAGE REACTORS FOR dc-TO-dc CONVERTERS Ph.D. Thesis
De Yu Chen 1975 188 p
Avail: Univ Microfilms Order No. 76-8733

Two methodical approaches to the design of energy-storage reactors for a group of widely used dc-to-dc converters were presented. One of these is based on a steady-state time-domain analysis of piecewise-linearized circuit models of the converters, while the other is based on an analysis of the same circuit models from an energy point of view. The design procedure developed from the first approach includes a search through a stored data file of magnetic core characteristics and results in a list of usable reactor designs which meet a particular converter's requirements. A digital computer usually is used to implement the design algorithm. The second approach, based on a study of the storage and transfer of energy in the magnetic reactors, leads to a relatively simple and straightforward design procedure which can be implemented rather quickly with hand calculations. The heart of this procedure is a specially constructed table of magnetic core characteristics. Dissert. Abstr.

N77-20400# Army Electronics Command, Fort Monmouth, N. J.
DESIGN SYMBOLS LIBRARY, A COMBINED DESIGN AND DOCUMENTATION TOOL
Thomas J. Wheeler Dec. 1976 59 p
(AD-A038620; ECOM-4452) Avail: NTIS HC A04/MF A01 CSCL 09/2

Current methods of design of electronic equipment produce documentation after the design, resulting in duplication of cost and inadequate documentation. A system is described which makes use of a Standard Library of design symbols to integrate the design/documentation process, thereby reducing cost and insuring adequacy of documentation. Author (GRA)

N77-28410# Purdue Univ., Lafayette, Ind. Center for Information and Numerical Data Analysis and Synthesis.
THERMOPHYSICAL AND ELECTRONIC PROPERTIES INFORMATION ANALYSIS CENTER (TEPIAC): A CONTINUING SYSTEMATIC PROGRAM ON TABLES OF THERMOPHYSICAL AND ELECTRONIC PROPERTIES OF MATERIALS Final Report, 1 Oct. 1975 - 31 Dec. 1976
Cho Yen Ho Feb. 1977 67 p
(Contract DSA900-76-C-0860)
(AD-A038198; AMMRC-CTR-77-7) Avail: NTIS
HC A04/MF A01 CSCL 20/12

This Final Report describes the activities and accomplishments of the Thermophysical and Electronic Properties Information Analysis Center (TEPIAC) in the period 1 October 1975 to 31 December 1976. TEPIAC's activities reported herein include literature search, acquisition, and input of source information; document review and codification and substance classification; operation of a computerized information storage and retrieval system; preparation and publication of the Thermophysical Properties Research Literature Retrieval Guide Supplement; data extraction and compilation; data evaluation, correlation, analysis, synthesis, and generation of recommended values; preparation and publication of the Thermophysical Properties of Matter - The TPRC Data Series, state-of-the-art reports, and critical reviews; technical and bibliographic inquiry services; and current awareness and promotion efforts. TEPIAC covers 14 thermophysical properties and 22 electronic (including also electrical, magnetic, and optical) properties and property groups of nearly all materials at all temperatures. GRA

N77-29407# Rome Air Development Center, Griffiss AFB, N.Y.
VACUUM TUBE AVAILABILITY ASSESSMENT PROGRAM. VOLUME 2: FAA TUBE/EQUIPMENT LISTS Final Report, Oct. 1976 - Mar. 1977
G. K. Huddleston (Georgia Inst. of Technol., Atlanta) Mar. 1977 191 p
(Contract DOT-FA72WAI-356)
(AD-A041309; FAA-RD-77-27-Vol-2) Avail: NTIS
HC A09/MF A01 CSCL 09/1

Alphanumeric lists of vacuum tubes and equipments used by the FAA are presented to assist in identifying specific pieces of equipment which may be affected by a shortage of a particular tube type. Each of the two lists indicated the type and number of tubes required for each piece of equipment. Author

N78-12230# IIT Research Inst., Annapolis, Md.
INDEX OF SPECTRUM SIGNATURE DATA
Aug. 1977 20 p Supersedes ECAC-I-IM(SS)
(Contract F19628-78-C-0017)
(AD-A044749; ECAC-I-1N(SS); ECAC-I-IM(SS)) Avail: NTIS
HC A02/MF A01 CSCL 09/3

This document is an index of all spectrum signature data collected in accordance with the procedures in MIL-STD-449 and submitted to ECAC. It is published for the purpose of acquainting government agencies and their contractors with the availability of these data. Users desiring any of these documents are requested to requisition them through the Defense Documentation Center (DDC), not from ECAC. For this purpose DDC reference numbers have been included where available. Those spectrum signatures with an L after the DDC number are controlled. Requests for these publications must be sent through the indicated service for approval prior to request from DDC. The DDC Technical Abstract Bulletins (TAB) indicate the appropriate military office to which the request should be addressed. The user is warned that, although MIL-STD-449 was used as a guide in collecting these data, variations in the equipment, specific requirements of the contracting agency and/or ECAC, or technical difficulties encountered in measuring, have made each report unique. Examination of each report is necessary to determine its usefulness for a particular need. This document supersedes ECAC I-1M (SS), Index of Spectrum Signature Data, May 1974.
Author (GRA)

N78-10292# Army Communications-Electronics Engineering Installation Agency, Fort Huachuca, Ariz.
DIGITAL TRANSMISSION EVALUATION PROJECT UNIVERSAL LOOP MULTIPLEXER ULM-101 Interim Report, Feb. - Jul. 1977
James E. Hament, O. P. Connell, and Henry S. Walczyk Sep. 1977 82 p refs
(AD-A046963; CCC-CED-77-DTEP-018) Avail: NTIS
HC A05/MF A01 CSCL 09/5

Testing of the ULM-101 loop multiplexer was initiated to establish a data base and assessment of the continuous variable slope delta (CVSD) and log CVSD modulation techniques and to evaluate its ability to interface with existing signals typical of those in use in the Defense Communications System (DCS). Twelve tests of voice channel performance were conducted and in general the minimum DCS performance specifications for voice channels were met by the ULM-101 when operating at 32 KBPS and 64 KBPS sampling rates. Performance was marginal at 16 KPBS and unsuitable at 8 KBPS. Ability of the ULM-101 to interface with VFCT, SF signalling and MF signalling equipment was evaluated to be marginal. Author (GRA)

N78-23304# National Technical Information Service, Springfield, Va.
HYBRID MICROELECTRONIC CIRCUITS, VOLUME 2. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1975 - Feb. 1978
William E. Reed Mar. 1978 248 p Supersedes NTIS/PS-77/0222
(NTIS/PS-78/0212/7; NTIS/PS-77/0222) Copyright. Avail: NTIS HC $28.00/MF $28.00 CSCL 09E

Research reports from worldwide literature relating to the technology of thick and thin film hybrid microcircuits are cited. Research on the design, materials, processing, fabrication, quality control, reliability, and applications of the circuits was included.
GRA

N78-25345# National Technical Information Service, Springfield, Va.
CHARGE TRANSFER DEVICES, VOLUME 2. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, Mar. 1976 - Mar. 1977
William E. Reed Mar. 1978 247 p
(NTIS/PS-78/0308) Copyright. Avail: NTIS
HC $28.00/MF $28.00 CSCL 09C

Research reports from worldwide literature are cited which cover the technology, design, fabrication, and applications of charge transfer devices. Applications include image devices, signal processors, amplifiers, filters, and memory devices. An updated bibliography containing 239 abstracts is presented. Author

N78-25346# National Technical Information Service, Springfield, Va.
CHARGE TRANSFER DEVICES. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Mar. 1978
William E. Reed Mar. 1978 251 p Supersedes NTIS/PS-77/0269; NTIS/PS-76/0240; NTIS/PS-75/275
(NTIS/PS-78/0307; NTIS/PS-77/0269; NTIS/PS-76/0240; NTIS/PS-75/275) Copyright. Avail: NTIS
HC $28.00/MF $28.00 CSCL 09C

The technology, design, fabrication, and applications of charge transfer devices are presented in the cited Federally sponsored research reports. Applications include imaging, signal processing, detectors, filters, amplifiers, and memory devices. An updated bibliography containing 248 abstracts is presented. Author

N78-25347# National Technical Information Service, Springfield, Va.
CHARGE TRANSFER DEVICES, VOLUME 3. CITATIONS FROM THE ENGINEERING DATA BASE Progress Report, Apr. 1977 - Mar. 1978
William E. Reed Mar. 1978 161 p Supersedes NTIS/PS-77/0271; NTIS/PS-76/0241
(NTIS/PS-78/0309; NTIS/PS-77/0271; NTIS/PS-76/0241) Copyright. Avail: NTIS HC $28.00/MF $28.00 CSCL 09C

Research reports from worldwide literature are cited which cover the technology, design, fabrication, and applications of charge transfer devices. Applications include image devices, signal processors, amplifiers, filters, and memory devices. An updated bibliography containing 205 abstracts is presented. Author

N78-28384# National Technical Information Service, Springfield, Va.

MICROWAVE OSCILLATORS, VOLUME 3. CITATIONS FROM THE NTIS DATA BASE Progress Report, Apr. 1976 - Mar. 1978

William E. Reed Apr. 1978 235 p Supersedes NTIS/PS-77/0299; NTIS/PS-76/0312; NTIS/PS-75/325
(NTIS/PS-78/0333/1; NTIS/PS-77/0299; NTIS/PS-76/0312; NTIS/PS-75/325) Avail: NTIS HC $28.00/MF $28.00 CSCL 09E

Federally-sponsored research reports are cited on the design, development, application, reliability, and radiation effects of microwave oscillators. GRA

N78-28385# National Technical Information Service, Springfield, Va.

MICROWAVE OSCILLATORS. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1975 - Mar. 1978

William E. Reed Apr. 1978 259 p Supersedes NTIS/PS-77/0300; NTIS/PS-76/0313
(NTIS/PS-78/0334/9; NTIS/PS-77/0300; NTIS/PS-76/0313) Avail: NTIS HC $28.00/MF $28.00 CSCL 09E

An updated bibliography containing 252 abstracts concerning bibliography cites reports from worldwide research on the design, performance, properties, and applications of microwave oscillators including Gunn, impatt, transistor, trapatt, transferred electron, Schottky, and surface acoustic wave oscillators. GRA

N78-28386# National Technical Information Service, Springfield, Va.

PHASED ARRAYS, VOLUME 3. CITATIONS FROM THE NTIS DATA BASE Progress Report, Mar. 1976 - Mar. 1978

William E. Reed Apr. 1978 145 p Supersedes NTIS/PS-77/0309, NTIS/PS-76/0308 and NTIS/PS-75/338
(NTIS/PS-78/0331/5; NTIS/PS-77/0309; NTIS/PS-76/0308; NTIS/PS-75/338) Avail: NTIS HC $28.00/MF $28.00 CSCL 09E

An updated bibliography containing 140 abstracts concerning the design, performance, radiation patterns, and applications of phased arrays are presented. Applications include communications, radar, optical, spacecraft, and navigational aids. GRA

N78-28387# National Technical Information Service, Springfield, Va.

PHASED ARRAYS. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1974 - Mar. 1978

William E. Reed Apr. 1978 250 p Supersedes NTIS/PS-77/0310 and NTIS/PS-76/0309
(NTIS/PS-78/0332/3; NTIS/PS-77/0310; NTIS/PS-76/0309) Avail: NTIS HC $28.00/MF $28.00 CSCL 09E

An updated bibliography containing 243 abstracts concerning reports from worldwide research on the design, performance, radiation patterns, and applications of phased arrays is presented. Applications include radar, communications, optical, electronic countermeasures, acoustic, aircraft, and spacecraft. GRA

N78-28388# National Technical Information Service, Springfield, Va.

GUNN EFFECT AND TRANSFERRED ELECTRON DEVICES, VOLUME 2. CITATIONS FROM THE NTIS DATA BASE Progress Report, May 1977 - Mar. 1978

William E. Reed Apr. 1978 89 p Supersedes NTIS/PS-77/0255; NTIS/PS-76/0271; NTIS/PS-75/227
(NTIS/PS-78/0361/2; NTIS/PS-77/0255; NTIS/PS-76/0271; NTIS/PS-75/227) Avail: NTIS HC $28.00/MF $28.00 CSCL 09A

An updated bibliography containing 84 abstracts concerning the application of Gunn effect and transferred electron devices to microwave generation, amplification, and control is presented. The Gunn effect in semiconductors is discussed. The design, fabrication, and properties of Gunn diodes and transferred electron devices are included. GRA

N78-28389# National Technical Information Service, Springfield, Va.

GUNN EFFECT DEVICES, VOLUME 2. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, Mar. 1976 - Mar. 1978

William E. Reed Apr. 1978 230 p Supersedes NTIS/PS-0257
(NTIS/PS-78/0362/0; NTIS/PS-77/0257) Avail: NTIS HC $28.00/MF $28.00 CSCL 09A

An updated bibliography containing 223 abstracts concerning the application of Gunn effect devices to microwave generation, amplification, and control is presented. The Gunn in semiconductors is discussed. Design, fabrication, and properties of Gunn diodes are included. GRA

N78-22382# National Technical Information Service, Springfield, Va.

BEAM LEAD MICROELECTRONICS. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Mar. 1978

William E. Reed Apr. 1978 83 p Supersedes NTIS/PS-77/0361; NTIS/PS-76/0348; NTIS/PS-75/248
(NTIS/PS-78/0368/7; NTIS/PS-77/0361; NTIS/PS-76/0348; NTIS/PS-75/248) Avail: NTIS HC $28.00/MF $28.00 CSCL 09E

The technology and application of beam lead devices are treated in these Federally-sponsored research reports. Topics include design, fabrication, bonding, packaging, testing, and radiation hardening. GRA

N79-20018# Boeing Aerospace Co., Seattle, Wash. Engineering Technology Div.

HYBRID TECHNOLOGY COST REDUCTION AND RELIABILITY IMPROVEMENT STUDY Final Report

H. M. Waldron, III and L. F. Buldhaupt Mar. 1978 184 p refs
(Contract N00163-77-C-0288)
(AD-A062247; D180-24064-1) Avail: NTIS HC A09/MF A01 CSCL 14/1

The objective of this multi-phase program is to develop the materials, processes, and controls to improve reliability and reduce cost of hybrid microelectronics for application in military avionic systems. The objective of the first phase, the study effort covered by this report, is to develop a data base for the subsequent phases. The first phase, performed over a 6-month period, consisted of two tasks: (1) collection of data and information and (2) data assessment and analysis. GRA

N80-12371# Georgia Inst. of Tech., Atlanta.

DEVELOPMENT OF AN ELECTRICAL LOAD DEMAND AND RESPONSE MODEL BASED ON A RATIONAL SYNTHESIS FROM ELEMENTARY DEVICES

Jul. 1979 89 p refs
(Contract EM-77-S-01-5109)
(DOE/ET-5109/1) Avail: NTIS HC A05/MF A01

A viable methodology is presented which can be used to synthesize models of power-system load to aid in the following major functions: on-line automatic generation control, short-term bus load forecasting; stochastic power-flow analysis, load management; operational planning; security assessment, and power system stability analysis. The scope of the project is limited to the development of methodology with all associated simulation programs. In order to avoid functioning in a vacuum, a limited amount of information obtainable from utilities and government agencies are utilized in providing a credible data base for the validation methodology and the tuning of model parameters. Although the developed models are primarily useful in the system operation context, the potential planning uses are properly delineated. The methodology develops two types of load models--load demand and load-response. DOE

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

A78-26664 **Prospects for computational fluid mechanics.** G. S. Patterson, Jr. (National Center for Atmospheric Research, Boulder, Colo.). In: Annual review of fluid mechanics. Volume 10. Palo Alto, Calif., Annual Reviews, Inc., 1978, p. 289-300. 16 refs.

It is thought that a four-day forecast of global or hemispherical weather, based on general circulation models (GCMs) with 200-400-km resolution, might be a reasonable goal for the mid-1980s. Mesoscale models which can provide local details not available on the basis of an employment of GCMs appear promising. There are, however, some currently not yet resolved questions concerning the application of boundary conditions. On scales from 60 to 2 km, there are cloud models such as those for supercell cumulonimbi, which are responsible for severe hail storms and tornados. It is hoped that the computing power available in the next five years will lead to a reliable three-dimensional cloud model with adequate dynamics and microphysics. The prospects for computational fluid mechanics are largely determined by computer technology. Attention is given to large computational systems, trends in technology, the growth of data processing, and the importance of software. It is concluded that greater computational power will become available, although the growth rate will be somewhat less than in the past in connection with certain technological and economic reasons. G.R.

N78-32383*# Stanford Univ., Calif. Dept. of Mechanical Engineering.
THE BEHAVIOR OF TRANSPIRED TURBULENT BOUNDARY LAYERS
W. M. Kays and R. J. Moffat Apr. 1975 114 p refs
(Grant NGR-05-020-134; Contract N00014-67-A-0112-0072; Grants NSF GK-534; NSF GK-2201)
(NASA-CR-118147; HMT-20) Avail: NTIS HC $5.25 CSCL 20D

Experimental and analytical studies of the heat transfer behavior of the turbulent boundary layer are summarized. The principal objective was the acquisition of a reliable data base and its modeling by means of a finite difference computer program. Experimental results are provided to the computer in terms of values and variations of mixing length parameters and turbulent Prandtl numbers. The data base covers a wide range of boundary conditions and free stream conditions. Conditions: free stream velocities, uniform velocity, accelerations at constant K up to relaminarization, and decelerations at constant B, but not including separation; transpiration suction and blowing at constant blowing fraction with stepwise and arbitrary variations; and wall temperature at uniform, stepwise, and arbitrary distributions. It is shown that a single pair of functions suffice to recover all of the data. Both the surface data and the profiles of mean velocity and temperpture are predictable with acceptable accuracy. Author

N78-33384# Cincinnati Univ., Ohio.
TWO PHASE PRESSURE DROP ACROSS ABRUPT AREA CHANGES
A. Hussain and J. Weismann Jan. 1975 124 p refs
(Contract AT(11-1)-2152)
(COO-2152-15) Avail: NTIS HC $6.25

The research was undertaken to develop a coherent view of two-phase pressure drop across abrupt area changes during steady flow. The objectives of the program were to establish an additional data base of observations of two-phase pressure drop across abrupt area changes, and to determine whether a single model based one-dimensional momentum theory can correlate the data obtained in the present investigation as well as that in the literature. Examination of the data available in the literature indicated that most of the pressure drop measurements across abrupt area changes were made with the steamwater system. To assure the generality of the correlating approaches developed, it was decided to conduct the test program with a nonwater system. The freon-freon vapor system was selected for this purpose. NSA

N78-12289# California Univ., Livermore. Lawrence Livermore Lab.
KEG, AN EULERIAN CONFIGURATION GENERATOR FOR BBC AND VOA
Stephen I. Warshaw May 1977 74 p refs
(Contract W-7405-eng-48)
(UCID-17461) Avail: NTIS HC A04/MF A01

The operating details for the use of KEG, the contents of the input deck required to set up a problem to be calculated on the BBC or VOA, and other miscellanea related to output and file handling are described. ERA

N78-31289# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
INVESTIGATION OF TEST FACILITY EFFECTS ON THE THREE-DIMENSIONAL BOUNDARY LAYER INTERACTION Final Report, Jan. - Apr. 1977
Jerold L. Patterson Nov. 1977 83 p refs
(AF Proj. 1366)
(AD-A054237; AFFDL-TR-77-113) Avail: NTIS HC A04/MF A01 CSCL 20/4

A continuing uncertainty when correlating three-dimensional shockwave/turbulent boundary layer interaction data obtained from different wind tunnel facilities is the extent of 'facility-peculiar' effects on the test data, particularly the effect of free-stream Reynolds number. The present study investigates the pressure and heat transfer data in the interaction region taken at Mach 3 in three different facilities to determine the degree of dependency of the data on facility effects. The study shows that, for constant Mach number, the interaction data are essentially independent of facility effects or can be made independent through proper modification. The report also provides general data illustrating the physics of the interaction process for comparison with previous studies and to add to the general data base on three-dimensional interactions. Author (GRA)

N80-26630# Oak Ridge National Lab., Tenn.
PERFORMANCE EVALUATION OF A SELECTED THREE-TON AIR-TO-AIR HEAT PUMP IN THE HEATING MODE
A. A. Domingorena and S. J. Ball Jan. 1980 106 p refs
(Contract W-7405-eng-26)
(ORNL/CON-34) Avail: NTIS HC A06/MF A01

An air-to-air split system residential heat pump of nominal under laboratory conditions. This was the second of a planned series of experiments to obtain a data base of system and component performance for heat pumps. The system was evaluated under both steady-state and frosting-defrosting conditions; sensitivity of the system performance to variations in the refrigerant charge was measured. From the steady-state tests, the heating capacity and coefficient of performance were computed, and evaluations were made of the performance parameters of the fan and fan motor units, the heat exchangers and refrigerant metering device, and the compressor. System heat losses were analyzed. The frosting-defrosting tests allowed the observation of system and component performance under dynamic conditions, and measurement of performance degradation under frosting conditions. DOE

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

A76-29480 # **Compu-Scene - Modular approach to day-night computer image simulation.** R. R. Raike (General Electric Co., Daytona Beach, Fla.). In: Visual and Motion Simulation Conference, Dayton, Ohio, April 26-28, 1976, Proceedings.
New York, American Institute of Aeronautics and Astronautics, Inc., 1976, p. 101-119.

Compu-Scene is a visual simulation system which provides the capabilities for realistically simulating scenes which portray a complete spectrum of ambient lighting conditions for a variety of aircraft and naval ship applications. The system is designed to allow the addition of functional elements with concomitant increases in system performance. The basic system provides 1000 edges and 2000 variable size point light sources to depict the scene. This can be modularly increased to 2000 edges and 4000 variable size point light sources. Other optional features include discretely variable raster format with the accompanying resolution variation, sun shading, curved surface shading, dynamic occulting, update rate, moving models, and the ability to provide up to 5 scenes for one simulator. (Author)

A76-38507 **Line-of-sight determination from digitized imagery.** M. A. Crombie and D. L. Ackerman (U.S. Army, Computer Sciences Laboratory, Fort Belvoir, Va.). In: American Society of Photogrammetry and American Congress on Surveying and Mapping, Fall Convention, Phoenix, Ariz., October 26-31, 1975, Proceedings.
Falls Church, Va., American Society of Photogrammetry, 1976, p. 119-130.

The basic notion of regarding the photograph as the primary data base is used to develop three single model techniques for determining whether line-of-sight exists between any two points within a stereo model. Two of the techniques use digital imagery. Only one of the methods is analyzed numerically. Matching processes using correlation methods are applied to a pair of digital images to determine the line-of-sight of two points 1200 meters apart. A microdensitometer with comparator capabilities created the digital gray shade data. The third technique, a visual one, requires that the model be set up in a stereoscopic device. (Author)

A77-44780 **Electro-optical systems and requirements in cartography.** H. Carr (U.S. Army, Engineer Topographic Laboratories, Fort Belvoir, Va.). In: Electro-optical Systems Design Conference and International Laser Exposition, New York, N.Y., September 14-16, 1976, Proceedings of the Technical Program.
Chicago, Industrial and Scientific Conference Management, Inc., 1976, p. 339-346.

Electro-optical systems employed by the U.S. Army Engineering Topographic Laboratories are discussed, with emphasis on electro-optical applications to cartography. Digital scanning and plotting of color separations and cartographic features are considered; the use of electro-optical devices for producing, storing and retrieving microfilmed copies of color topographic maps is also described. In particular, development of a laser scanner-projector for microfilm map application, and an optical disc drive for storing large terrain data bases on easily-retrieved optical media is mentioned. The automatic extraction of cartographic data from aerial photography and applications of sensing array technology to data analysis and map production are also reviewed. J.M.B.

A79-17136 **Digital information optical recording in pictorial format.** A. A. Atkins (Itek Corp., Lexington, Mass.). In: Airborne reconnaissance III /Collection and exploitation of reconnaissance data/; Proceedings of the Seminar, Washington, D.C., March 28, 29, 1978. Bellingham, Wash., Society of Photo-Optical Instrumentation Engineers, 1978, p. 76-83.

The paper describes a technique combining metal-on-plastic recording technology and unique three-dimensional matrix formatting technology. This technique permits high bit packing densities, extension of recording media dynamic range, and - most importantly - the recording and retrieval of extremely large digital pixel word values within a human readable/machine readable pictorial format. The technique has been designed for imagery recording applications with conventional silver-based film, electrostatic materials, and metallized film materials. B.J.

A79-17588 **A diagnostics-oriented system for thermocouple thermometry.** R. P. Reed (Sandia Laboratories, Albuquerque, N. Mex.). In: International Instrumentation Symposium, 24th, Albuquerque, N. Mex., May 1-5, 1978, Proceedings. Part 1.
Pittsburgh, Pa., Instrument Society of America, 1978, p. 163-176. 12 refs. Research supported by the U.S. Department of Energy.

Errors arising in faulty circuits are common in thermocouple measurements made in severe environments. The significant errors may distort maximum temperature indications, introduce or obscure significant features in a temperature history, or grossly misrepresent the actual locations of a measurement. The present paper describes three complementary diagnostic techniques for the validation of thermocouple data from severe environments. They are (1) branched thermocouple circuits, (2) COMUX (combinatorial line multiplexer) scanners, and (3) a comprehensive computer-oriented data base. Consideration is given to the principles of these novel measurement tools and to an associated data acquisition system which uses them for research on in situ energy recovery methods. B.J.

A80-17538 **Measuring scene content from aerial images.** E. L. Hall, J. J. Hwang, C. C. Lee, and M. Hwang (Tennessee, University, Knoxville, Tenn.). In: Digital processing of aerial images; Proceedings of the Seminar, Huntsville, Ala., May 22-24, 1979.
Bellingham, Wash., Society of Photo-Optical Instrumentation Engineers, 1979, p. 215-223. 7 refs. DARPA-supported research; Contract No. F04701-77-C-0072. ARPA Order 3362.

The problem of scene description is on the forefront of modern image processing and scene analysis research. The paper describes a recently developed theory of scene content measurement and presents experimental results of two measures, called structural entropy and structural content, which are used to measure the complexity of a building complex. The method of scene representation using a relational table and scene content measurement is reviewed. A method for representing a scene by polygonal objects is described, and a new technique for vertex location is presented. An error analysis is presented of the mean square error in the transformational computation between a three-dimensional scene and the corresponding two-dimensional projected images, given a number of corresponding vertices. The analysis reveals that the best possible performance depends heavily on the vertex location accuracy. S.D.

A80-29802 * **Future trends in image processing software and hardware.** W. B. Green (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). In: Machine processing of remotely sensed data; Proceedings of the Fifth Annual Symposium, West Lafayette, Ind., June 27-29, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 436-446. 18 refs. Contract No. NAS7-100.

JPL image processing applications are examined, considering future trends in fields such as planetary exploration, electronics, astronomy, computers, and Landsat. Attention is given to adaptive search and interrogation of large image data bases, the display of multispectral imagery recorded in many spectral channels, merging data acquired by a variety of sensors, and developing custom large scale integrated chips for high speed intelligent image processing user stations and future pipeline production processors. J.P.B.

A80-29978 * **Analysis of multiple imagery at Jet Propulsion Laboratory's Image Processing Laboratory.** W. B. Green, N. A. Bryant, P. L. Jepsen, R. G. McLeod, J. A. Mosher, R. H. Selzer, W. D. Stromberg, G. M. Yagi, and A. L. Zobrist (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *Optical Engineering*, vol. 19, Mar.-Apr. 1980, p. 168-179. 17 refs. Contract No. NAS7-100.

During the past decade advanced techniques have been developed at JPL for processing large volumes of imagery returned by the more recent planetary spacecraft. In addition, the Image Processing Laboratory has become involved in the processing of earth resources imagery acquired by Landsat and a variety of other sensors flown on aircraft and spacecraft. The trend within the facility has been toward the development of technology capable of processing increasingly larger image data bases. A variety of applications in both the planetary and earth observations areas involve the merging and/or processing of more than one image and often require the correlation of data acquired by a variety of sensors. B.J.

N76-14303* **Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Communications Elements Research Section.**
AN X-BAND RADIOMETER FOR THE MICROWAVE WEATHER PROJECT
M. S. Reid, O. B. Parham, and R. A. Gardner *In its* **The Deep Space Network 15 Oct. 1975 p 54-59 refs**

CSCL 14B

A stabilized high resolution X-band radiometer was designed, constructed, and is presently operating at the Venus Deep Space Station in the Goldstone Deep Space Communications Complex in California. The radiometer is an automatically switched and automatically calibrated noise-adding radiometer and is used for atmospheric propagation research for the Microwave Weather Project. A description is given of the radiometer, its sensitivity, and examples of its performance. Author

N76-25641# Avco Systems Div., Wilmington, Mass.
PHOTOMETRIC DATA FORMAT Final Report
R. Gamache 5 Jan. 1976 32 p
(Contract F04701-75-C-0133)
(AD-A019458; AVSD-0005-76-RR; SAMSO-TR-75-253) Avail: NTIS CSCL 15/4

This report describes the magnetic tape characteristics and data parameter formats used for storage of U.S. and foreign satellite photometric measurements in the Data Base Library at Avco/SD. This document provides the necessary information to allow approved users to read and utilize the photometric data written on the library tapes. Author (GRA)

N77-10426# Rome Research Corp., N. Y.
RECONNAISSANCE SENSOR SYSTEM EXPLOITATION Final Technical Report, May 1975 - Jun. 1976
Richard R. Petroski Griffiss AFB, N.Y. RADC Aug. 1976 50 p
(Contract F30602-75-C-0172; AF Proj. 6244)
(AD-A031024; RRC-76-1; RADC-TR-76-248) Avail: NTIS HC A03/MF A01 CSCL 15/5

The report documents several tasks accomplished under the project titled 'Reconnaissance Sensor System Exploitation'. It is intended to give a brief summary of the sensor evaluations and analyses performed under the project along with Data Base and Northeast Test Area (NETA) support provided. Other efforts, considered to be of limited interest to the reconnaissance community, are not included. GRA

N78-14574# University of Southern Calif., Los Angeles. Image Processing Inst.
THE USC-IMAGE PROCESSING INSTITUTE DATA BASE, REVISION 1
Ray Schmidt Oct. 1977 44 p
(Contract F33615-76-C-1203; ARPA Order 3119)
(AD-A046215; USCIPI-780) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report represents effort expended in attempting to meet the needs of the ARPA-IPTO Image Understanding community in providing the availability of a digital image data base. The data base will never be complete as it is the intention of the USC-IMAGE Processing Institute to update and maintain the base as long as the sponsor and scientific community indicates a need for same. The picture files are individually or collectively accessible either over the ARPANET or via the U.S. mails. GRA

N78-27305# National Technical Information Service, Springfield, Va.
SCHLIEREN AND SHADOWGRAPH PHOTOGRAPHY. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Mar. 1978
Guy E. Habercom, Jr. May 1978 325 p Supersedes NTIS/PS-77/0346; NTIS/PS-76/0335; NTIS/PS-75/117
(NTIS/PS-78/0411/5; NTIS/PS-77/0346; NTIS/PS-76/0335; NTIS/PS-75/117) Avail: NTIS HC $28.00/MF $28.00 CSCL 14E

A bibliography containing 318 abstracts on the applications and techniques of schlieren and shadowgraph photography is presented. The majority of the information is primarily concerned with flow visualization, although studies on heat transfer and combustion processes are also included. GRA

N78-27306# National Technical Information Service, Springfield, Va.
SCHLIEREN AND SHADOWGRAPH PHOTOGRAPHY. PART 1: FLOW VISUALIZATION AND MEASUREMENT. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Mar. 1978
Guy E. Habercom, Jr. May 1978 211 p Supersedes NTIS/PS-77/0347; NTIS/PS-76/0336
(NTIS/PS-78/0412/3; NTIS/PS-77/0347; NTIS/PS-76/0336) Avail: NTIS HC $28.00/MF $28.00 CSCL 14E

A bibliography containing 204 abstracts concerning worldwide engineering research of Schlieren and shadowgraph photography techniques for flow measurement and visualization is presented. Included are studies on flames, combustion, and aerodynamic configurations. GRA

N78-27307# National Technical Information Service, Springfield, Va.
SCHLIEREN AND SHADOWGRAPH PHOTOGRAPHY. PART 2: GENERAL STUDIES. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Mar. 1978
Guy E. Habercom, Jr. May 1978 234 p Supersedes NTIS/PS-77/0348; NTIS/PS-76/0337
(NTIS/PS-78/0413/1; NTIS/PS-77/0348; NTIS/PS-76/0337) Avail: NTIS HC $28.00/MF $28.00 CSCL 14E

A bibliography containing 227 abstracts concerning aspects of schlieren and shadowgraph photography is presented. Techniques, equipment, and applications are reviewed for studying shock waves, combustion, acoustic waves, ballistics, and heat flow. GRA

N78-28417# **Sandia Labs., Albuquerque, N. Mex.**
DIAGNOSTICS-ORIENTED SYSTEM FOR THERMOCOUPLE THERMOMETRY
R. P. Reed 1978 14 p refs Presented at the 24th Intern. Instrumentation Symp., Albuquerque, N. Mex., 1 May 1978
(Contract EY-76-C-04-0789)
(SAND-77-1864C; Conf-780503-1) Avail: NTIS HC A02/MF A01

Thermocouple temperature measurements in hostile environments are subject to insidious error. The nature and source of

some problems are described. Quick detection, diagnosis, and correction of faulty behavior is necessary to reduce error and to separate valid from spurious segments of data. Complementary diagnostic measures are required. They must be timely, convenient, and economical. Three techniques were developed to provide these: branched thermocouple circuits, COMUX Scanners (combinatorial line multiplexers), and a comprehensive computer-oriented data base. The principles of these novel measurement tools and an associated data acquisition system (DAS) which now uses them for research on in situ energy recovery methods are described. ERA

N79-12422/ General Electric Co., Daytona Beach, Fla.
AIRBORNE ELECTRO-OPTICAL SENSOR SIMULATION SYSTEM Final Report, Jun. 1976 - Dec. 1977
Dan Hayworth Aug. 1978 25 p
(Contract F33615-76-C-0068)
(AD-A058835; AFHRL-TR-78-41) Avail: NTIS HC A02/MF A01 CSCL 09/2

The effort as documented in this report describes the total system capability. This includes a description of all the special purpose and general purpose hardware comprising the Airborne Electro-Optical Sensor Simulation (AEOSS) System. The functional relationship between hardware portions is described together with interface to the software portion of the computer image generation. Supporting rationale for selection and arrangement of hardware is also provided together with a description of the data base region. Author (GRA)

N79-17200/ Harry Diamond Labs., Adelphi, Md.
PRELIMINARY DESIGN OF A PORTABLE PROGRAMMABLE DATA RECORDER
Edward W. Burke and Maurice F. Funke Jun. 1978 22 p refs
(AD-A061015; HDL-TM-78-9) Avail: NTIS HC A02/MF A01 CSCL 14/3

A preliminary paper design of a portable data recorder has been completed and its projected performance analyzed. The recorder is a hand-held, battery-powered device that can record, on a single tape cassette, both analog (voice) and digital (keyboard) data. In addition, it provides visual and audible prompts for the operator, as well as, data playback and editing capabilities. Recorded digital data can be directly electronically entered into a computer data base. Since the device is controlled by a microprocessor, it is very versatile in nature and, through simple programming (software) changes, can be adapted for use in a great variety of data-gathering applications. A preliminary design of the major components of the device, which include a microprocessor, keyboard, memory, tape-cassette drive, alphanumeric display, and power supply, is discussed. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

A78-40221 **The OMEGA fusion laser system.** J. Hoose (Rochester, University, Rochester, N.Y.). In: Systems integration and optical design II - Another look; Proceedings of the Seminar, Reston, Va., April 18-21, 1977. Bellingham, Wash., Society of Photo-Optical Instrumentation Engineers, 1977, p. 22-28.

The article describes the 30-terawatt, neodymium glass laser irradiation facility called OMEGA, used for fusion experiments. General system objectives are given in terms of characteristics and requirements (including energy over 6 KJ at 200 ps FWHM, variable pulse shape, 1.064-micron wavelength, 15-20 cm beam aperture, and 24 beams in spherical geometry). A schematic design of the operational interactions between the laser and target data base, the sponsors, and the users is presented along with a design plan of the entire laser system. A review is made of the functions of each of the subsystems which include the laser, alignment, control room and computer, target, facilities, and structures. S.C.S.

A80-44133 # **Modelling of the interaction of 10.6 micron pulsed laser radiation with reinforced plastic materials.** A. Ballantyne, J. A. Woodroffe, T. L. Cronburg (Avco Everett Research Laboratory, Inc., Everett, Mass.), R. R. Rudder (USAF, Weapons Laboratory, Albuquerque, N. Mex.), and M. J. Bina (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.). *American Institute of Aeronautics and Astronautics, Fluid and Plasma Dynamics Conference, 13th, Snowmass, Colo., July 14-16, 1980, Paper 80-1318.* 10 p. 7 refs.

The objective of this work was to develop a phenomenological model of pulsed CO2 laser interaction with reinforced composite materials. A heat transfer model was developed to describe the observed delamination behavior of the composite materials. Good agreement was obtained between the model predictions and experimental data. The model has been used to extrapolate to high average power irradiation. (Author)

N77-20437/ Naval Research Lab., Washington, D.C.
MPLAW: A MULTIPLE-SCALING-LAW CODE USING DATA-BASE INTERPOLATION Interim Report
D. Merritt Cordray 6 Oct. 1976 38 p refs
(NRL Proj. R05-31)
(AD-A032026; NRL-8055) Avail: NTIS HC A03/MF A01 CSCL 20/5

This report describes a program which provides the average focal-plane irradiance of a multiple-pulse truncated-Gaussian laser beam, given the input parameters necessary to describe the laser and the atmospheric conditions. The program contains a data base consisting of 720 data points which were obtained using the NRL propagation code. The irradiance is calculated by linear interpolation (or extrapolation) of a set of points from this data base. The program can be easily modified to use an expanded data base or to accept data for other beam shapes. GRA

N78-20400/ Army Electronics Command, Fort Monmouth, N. J.
MEASUREMENTS REQUIRED FOR PREDICTION OF HIGH ENERGY LASER TRANSMISSION Research and Development Technical Report
Wendell R. Watkins, Kenneth O. White, Charles W. Bruce, Donald L. Walters, and James D. Lindberg Dec. 1977 31 p refs
(DA Proj. 1L1-61102-B-53A)
(AD-A049628; ECOM-5834) Avail: NTIS HC A03/MF A01 CSCL 20/5

Accurate predictive models are required for design, testing, and field use of high energy laser systems. The success of these models for transmission predictions including linear and nonlinear effects is made possible only by the availability of a good atmospheric-parameter data base which must include turbulence, crosswind, gaseous absorption, and aerosol extinction. A review is given herein of the status of this data base for White Sands Missile Range, the effects recent measurements made by the Atmospheric Sciences Laboratory have on high energy laser transmission predictions, and facility capabilities available with plans to resolve remaining problem areas. No attempt is made to select the best laser source, but several effects are discussed which may have direct bearing on such a choice. Author (GRA)

N79-28800/ Science Applications, Inc., Ann Arbor, Mich.
SPECTROSCOPIC DATA BASE FOR LASER TRANSMISSION MODELING Final Report
D. R. Woods, D. H. Leslie, J. L. Manning, and R. E. Meredith Dec. 1977 184 p refs
(Contract N00173-76-C-0152)
(AD-A068020; SAI-77-012-AA) Avail: NTIS HC A09/MF A01 CSCL 20/6

High resolution (approx. - 05/cm) molecular line absorption measurements have been performed in the 3-5 micrometer spectral region. This data completes the measurements activities directed toward developing field verified predictive modeling of DF laser atmospheric molecular absorption. Some 181 HDO line profile measurement sets are presented for the path length and partial pressure combinations required to determine the air broadened HDO line parameters. Also, synthetic atmospheric molecular absorption spectra have been generated for the several molecular absorbers (H_2O, CH_4, HDO, CO_2) known to be important in the DF laser region. During the course of the DF transmission modeling effort, it became apparent that the line of sight molecular content should depend on the location and environmental conditions. To monitor the HDO molecular content, a Gas Filter Correlation Spectrometer (GFSC) was designed, constructed and delivered to NRL. Since the variability of HDO in the real atmosphere was shown by NRL to be quite dramatic and important, a design study to expand the GFCS capability was initiated. This study is included in this report. GRA

N80-11419*# National Aeronautics and Space Administration, Washington, D. C.
SCIENTIFIC OBJECTIVE 4: METEOROLOGICAL DATA
In its Shuttle Atmospheric Lidar Res. Program 1979 p 48-57 refs
Avail: NTIS HC A11/MF A01 CSCL 20E

The augmentation of the meteorological data base using lidar and other sensors is discussed. The development of satellite temperature sounders and their application in understanding and forecasting weather is reviewed. The lidar technique combined with the method of differential to permit the direct measurement of either the surface pressure or cloud pressure heights is examined. The resolution and accuracies required of various parameters for improvements in weather forecasting and the performance that is expected from various lidar experiments are summarized. A.W.H.

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

A77-38895 **Discontinuous fiber reinforced metal matrix composite materials.** W. H. Pfeifer, P. G. Sullivan, and L.W. Davis (Nevada Engineering and Technology Corp., Long Beach, Calif.). In: Bicentennial of materials; Proceedings of the Eighth National Technical Conference, Seattle, Wash., October 12-14, 1976. Azusa, Calif., Society for the Advancement of Material and Process Engineering, 1976, p. 479-486.

A brief review is provided concerning activities related to the development of metal matrix composites for advanced high temperature structural applications, connected with the design of future submarine-launched ballistic missile systems. A description is presented of a number of problems which currently limit the rate of expansion of discontinuous reinforced fiber metal matrix composite systems. Attention is given to an applications analysis for low cost composites, composite billet fabrication and scale-up studies, metallurgical processing by conventional metalworking techniques, and materials characterization for an expanded design data base. G.R.

A78-16909 **Using group technology concepts on machined parts.** R. J. Porazynski (Lockheed Missiles and Space Co., Inc., Missile Systems Div., Sunnyvale, Calif.). In Diversity - Technology explosion; Proceedings of the Twenty-second National Symposium and Exhibition, San Diego, Calif., April 26-28, 1977. Azusa, Calif., Society for the Advancement of Material and Process Engineering, 1977, p. 563-574.

Specific benefits obtained in connection with an employment of the considered group technology concepts are related to the elimination of redundant designs, an increased standardization of design features and manufacturing processes, and accurate evaluations of economic elements of design and manufacturing tradeoffs. The group technology approach makes use of an integrated system of computerized data files to improve the design/manufacturing producibility interfaces. An expanded engineering component retrieval capability is designed by developing appropriate classification procedures. Specific system flow charts are established for an employment of supporting files and specifications. G.R.

A78-29425 **Equations relating contact fatigue life to some material, lubricant, and operating variables.** F. C. Bock, S. Bhattacharyya, and M. A. H. Howes (IIT Research Institute, Chicago, Ill.). *American Society of Lubrication Engineers and American Society of Mechanical Engineers, Joint Lubrication Conference, Kansas City, Mo., Oct. 3-5, 1977, ASLE Preprint 77-LC-1B-1*. 10 p. 6 refs.

The data base for this study consists of the 448 life tests performed at the authors' laboratories during the four phases of an experimental program on chemical effects in contact fatigue sponsored by the Research Committee on Lubrication of ASME. Three papers have been published on the results obtained through Phase III. This paper presents statistical analyses of the combined tests and selected subsets of special interest. Eleven performance equations are given, with contact fatigue life as the measure of performance and with a number of material, lubricant, and operating factors (type of steel, surface finish, base oil, additive, moisture, slip, speed, stress, several covariates) as predictive variables. Log-normal and Weibull equations for fatigue life are compared. (Author)

A80-42189 # **Jet engine computer aided tube design system.** D. C. Jones, C. D. Head, and J. Crupi (United Technologies Corp., Pratt and Whitney Aircraft Group, West Palm Beach, Fla.). *American Society of Mechanical Engineers, Gas Turbine Conference and Products Show, New Orleans, La., Mar. 10-13, 1980, Paper 80-GT-38*. 5 p. Members, $1.50; nonmembers, $3.00.

At Pratt and Whitney Aircraft a system to design tubing, produce final engineering drawing and establish data for manufacturing was developed that effectively integrates man and computer. A 'wire tube' defined on a wooden mockup is fed to a host computer to perform stress and vibration analysis and check clearance to other tubes and components. The tube is then retrieved from a data base, maintained on the host, by the Computervision system to produce final drawings. The data base is then available to manufacturing to drive an automatic tube bender. (Author)

N75-28432# Boeing Co., Seattle, Wash.
HYDROFOIL ANALYSIS AND DESIGN PROGRAM (HANDE), PHASE O Final Report
A. J. Brennan, J. D. Burroughs, W. C. Hurt, E. O. Wichert, and D. Wacker 1974 288 p refs
(Contract N00600-73-C-0450)
(AD-A008487; D221-51302-1) Avail: NTIS CSCL 13/10

A digital computer program, Hydrofoil Analysis and Design (HANDE), for use in the feasibility and early preliminary design of hydrofoil ships has been defined in detail under Phase O of Contract N00600-73-C-0450. This program includes sixteen integrated, technology oriented computational modules which function under a controlling executive program. A computerized data bank facilitates program input and forms a depository for hydrofoil ship data. All HANDE functions may be performed interactively as well as through batch operation. This document describes in detail the design procedure and approach to be taken in the development and implementation of HANDE. GRA

N75-28433# Boeing Co., Seattle, Wash.
HYDROFOIL ANALYSIS AND DESIGN PROGRAM (HANDE), PHASE O EXTENSION Final Report
A. J. Brennan, J. D. Burroughs, D. H. Wacker, and E. O. Wichert 1974 198 p refs
(Contract N00600-73-C-0450)
(AD-A008488; D321-51303-1) Avail: NTIS CSCL 13/10

This document reports on certain tasks that have been completed on the Hydrofoil ANalysis and DEsign (HANDE) program. Those portions of the HANDE executive and data bank maintenance programs which are required to control the execution of analysis modules are described. Two analysis module subroutines, the Initialization module and the Hull Structural Sizing module, are described and examples of their operation are given. The Initialization module is designed to parametrically generate ship size and configuration parameters for use in the Synthesis Section of HANDE. However, this module may also be used for performing high level trade studies. The Hull Structural Sizing module sizes the hull shell and deck structure to meet specified loading conditions. GRA

N77-23907# Transportation Systems Center, Cambridge, Mass.
THE 1975 AUTOMOTIVE CHARACTERISTICS DATA BASE Final Report, Jun. 1975 - 1976
Moses Rouse and William Basham Oct 1976 136 p Sponsored by DOT
(PB-262015/1; DOT-TSC-OST-76-27) Avail NTIS HC A07/MF A01 CSCL 13F

Automobile characteristics as a supportive tool for auto energy consumption, fuel economy monitoring, and fleet analysis studies are presented. The methods of vehicle sample selection, computation methods for statistical reports, illustrative output examples, and instructions for operating the data base are presented to fully represent the 1975 automobile fleet characteristics. GRA

N78-23452 National Technical Information Service, Springfield, Va
ELECTRON BEAM WELDING. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Jan. 1978
William E. Reed Mar 1978 247 p Supersedes NTIS/PS-77/0156, NTIS/PS-76/0136 and NTIS/PS-75/226
(NTIS/PS-78/0184/8; NTIS/PS-77/0156; NTIS/PS-76/0136; NTIS/PS-75/226) Copyright Avail NTIS HC $28.00/MF $28.00 CSCL 13H

This updated bibliography contains 242 abstracts of federally-sponsored research reports concerning the development, automation, and applications of electron beam welding. Properties of electron beam welds and weldability of steel, aluminum, refractory metals, heat resistant alloys, and corrosion resistant alloys are included. Thirty-six citations are new entries to the previous edition. GRA

N78-23453 National Technical Information Service, Springfield, Va
ELECTRON BEAM WELDING, VOLUME 1. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1974 - 1976
William E. Reed Mar 1978 234 p
(NTIS/PS-78/0185/5) Copyright Avail NTIS HC $28.00/MF $28.00 CSCL 13H

Reports from worldwide research are cited covering the process, automation, equipment, and applications of electron beam welding. Properties and weldability of steel, aluminum, titanium, refractory, metals, and heat resistant alloys included in this updated bibliography contain 226 abstracts, none of which are new entries to the previous edition. GRA

N78-23454 National Technical Information Service, Springfield, Va
ELECTRON BEAM WELDING, VOLUME 2. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1977 - Feb. 1978
William E. Reed Mar 1978 100 p Supersedes NTIS/PS-77/0157, NTIS/PS-76/0137
(NTIS/PS-78/0186/3; NTIS/PS-77/0157; NTIS/PS-76/0137) Copyright Avail NTIS HC $28.00/MF $28.00 CSCL 13H

This updated bibliography contains 93 abstracts of reports from worldwide research on electron beam welding and the properties and weldability of steel, aluminum, titanium, refractory metals, and heat resistant alloys. Only three of the citations appeared in the previous edition. GRA

N78-28435# Machinability Data Center, Cincinnati, Ohio.
THE MACHINABILITY DATA CENTER Annual Report, 1 Jan. - 31 Dec. 1977
John F. Kahles (Metcut Res. Assoc., Inc.) and John L. Krebs (Metcut Res. Assoc., Inc.) Mar 1978 52 p refs
(Contract DSA900-77-C-3197)
(AD-A053027; AMMRC-TR-78-13; AR-13) Avail NTIS HC A04/MF A01 CSCL 05/2

Machinability Data Center (MDC) operations during this reporting period resulted in the successful accomplishment of its contractual goals. Cost recovery income during the period was 72%, measured in actual dollars received for services provided. This center is one of a number of Information Analysis Centers sponsored by the Department of Defense. The specific functions of MDC include the collection, evaluation, storage, and dissemination of information pertaining to machining technology with emphasis on machinability data. The objectives of MDC's efforts are to decrease the cost of machining and to increase the productivity and reliability of machined products in behalf of the Department of Defense and other U.S. Government Agencies and their contractors. Because there is a continuing need for the universal application of evaluated machining data, MDC services are also made available to private industry. GRA

N77-30224# Army Test and Evaluation Command, Aberdeen Proving Ground, Md.
ELECTROMAGNETIC RADIATION EFFECTS AND/OR HAZARDS TEST Final Report
18 Mar. 1976 16 p Revised
(AD-A039703; TOP-1-2-511) Avail NTIS HC A02/MF A01 CSCL 09/3

Provides methods for instrumenting and testing Army Materiel to determine the effect of an electromagnetic environment on the operation and/or safety of the materiel. Author (GRA)

N79-14280# National Technical Information Service, Springfield, Va.
ROLLER BEARINGS. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Sep. 1978
Guy E. Habercom, Jr. Oct. 1978 218 p Supersedes NTIS/PS-77/0987; NTIS/PS-76/0887
(NTIS/PS-78/1111/0; NTIS/PS-77/0987; NTIS/PS-76/0887) Avail: NTIS HC $28.00/MF $28.00 CSCL 13I

A bibliography containing 214 abstracts concerning the design and performance of roller bearings is presented. Rolling contact bearing surfaces, hardening methods, mechanical properties, and lubricating techniques are among the areas reviewed. GRA

N79-17248# Volkswagen A.G., Wolfsburg (West Germany). Research Div.
ENGINEERING MODEL OF FUTURE MOTOR VEHICLES VOLUME 2: DATA BOOK Final Report, Jul. 1976 - Sep. 1977
H. W. Grove Jan. 1978 62 p
(Contract DOT-HS-5-01273)
(PB-287348/7; DOT-HS-803446) Avail NTIS HC A04/MF A01 CSCL 13F

The Engineering Model of Future Motor Vehicles, previously reported in February 1977 provided the safety engineer with a computerized data base including passenger car information such as configuration, geometric, weight, performance, and registration data with a program for statistical analysis and retrieval of the data in various formats including time series trends. This report gives a brief introduction to the program system and the contents of the data base as updated January 1978. This data book is intended to be a handy reference guide for the user to operate the program at the terminal. GRA

N79-22527# General Electric Co., Schenectady, N. Y. Gas Turbine Div.
HIGH TEMPERATURE GAS TURBINE ENGINE COMPONENT MATERIALS TESTING PROGRAM, TASK 1 Annual Report, 1977
C. T. Sims 15 Mar. 1978 175 p
(Contract EX-76-C-01-1765)
(FE-1765-43) Avail: NTIS HC A08/MF A01

The objective of this program is to provide a data base for performance of gas turbine nozzle and bucket materials in coal-derived liquid (CDL) and low-Btu gas environments at temperatures up to 2200 F. This report covers accomplishments during the year 1977. Activity consists of 'Initial Tests' to define the problems, 'Screening Tests' to evaluate a range of high-temperature materials, and 'Confirmation Tests' to evaluate the best materials and cooling design under realistic conditions. The report gives results of totals of 345 h of testing in simulated industrial-size gas turbine rig testing in CDL and 210 h in low Btu gas. Various levels of ash and alkali metal content were studied in the CDL test. Results of corrosion, fouling and system performance are given. Similarly, low Btu gas combustion was investigated through the 'Initial' and 'Confirmation' test stages with industrial-size systems being evaluated for performance, corrosion and fouling. The latter test was for 55 h, utilizing an air-cooled nozzle cascade, a gas cleanup system and the GEGAS low-Btu gasifier. ERA

N80-16346# SKF Industries, Inc., King of Prussia, Pa.
M-50 STEEL BEARING MATERIAL FACTORS FOR ROLLING ELEMENT LIFE CALCULATIONS Final Report, 18 Dec. 1977 - 1 Apr. 1979
Frank R. Morrison, John I. McCool, and Nicholas J. Ninos 1 Apr. 1979 113 p refs
(Contract DAAK50-77-C-0009)
(AD-A074217; SKFAL79T013; USAAVRADCOM-TR-79-35)
Avail: NTIS HC A06/MF A01 CSCL 13/9

This report presents the results of a survey accumulating life results achieved from bearings manufactured from M-50 tool steel. Life data have been analyzed according to an existing computer program, TABACY. Material and lubrication factors have been determined using this data base, enabling a more accurate calculation of the potential life of a bearing. In addition, this report includes experimental endurance life data obtained on three groups of rolling element bearings manufactured of Vacuum Induction Melted Vacuum Arc Remelted (VIMVAR) M-50 steel. The three bearing designs, all of which have a 45 mm internal diameter, consist of a deep groove ball, an angular contact ball, and a cylindrical roller configuration. These types have been run under several operational conditions using circulating Mobil Jet II synthetic lubricating fluid MIL-L-23699. GRA

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques, and quality control.

A75-35252 **Reliability and maintainability allocation for avionic maintenance optimization.** D. E. Brown and W. R. Krupa (USAF, Systems Command, Wright-Patterson AFB, Ohio). In: Automatic support systems for advanced maintainability; Symposium, San Diego, Calif., October 30-November 1, 1974, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1974, p. 9-14.

A systematic approach for allocating reliability and maintainability factors to weapon system avionics is under development to optimize avionics maintenance. This approach will provide a means to establish mission effective maintenance concepts. The approach deals with describing functions and allocating reliability and maintainability figures to influence avionics design in terms of the definition of an LRU (Line Replaceable Unit). (Author)

A77-12720 * **Nickel cadmium cell composite reliability model.** W. W. Kirsch (Sperry Rand Corp., Huntsville, Ala.) and L. E. Paschal (NASA, Marshall Space Flight Center, Huntsville, Ala.). In: Intersociety Energy Conversion Engineering Conference, 11th, State Line, Nev., September 12-17, 1976, Proceedings. Volume 1. New York, American Institute of Chemical Engineers, 1976, p. 521-527. Contract No. NAS8-21812.

Ni-Cd battery reliability has become a critical design parameter with the increasing need for longer life and optimally designed secondary battery power systems in space as well as in more mundane applications. It is the purpose of this paper to present a state-of-the-art Ni-Cd cell reliability model as a function of cumulative cyclic operation, cell temperature and cyclic depth-of-discharge. In addition, a simple and convenient cell failure analysis technique will be presented in which the reliability, the distribution, and the distribution parameters can be determined by visual inspection. (Author)

A77-30474 # **The reliability data bank of the 'Circolo dell'Affidabilità' at IEN.** A. Bobbio and O. Saracco (Istituto Elettrotecnico Nazionale Galileo Ferraris, Turin, Italy). *(Conferenza sulle Banche Dati di Affidabilità e l'Impiego dei Dati nell'Industria, Turin, Italy, Oct. 14, 1976.) Alta Frequenza* (English Edition), vol. 46, Feb. 1977, p. 129-133.

The BASEDA reliability data bank system set established at a facility of the Circolo dell'Affidabilità is discussed. The BASEDA system is programmed in FORTRAN IV and ASSEMBLER. The flexibility of the system is explained with attention given to capability for dialog with an external user. Storage codes and data handling procedures are described. Data are acquired from the field, from life tests, associated data banks, and technical periodicals. Forms to be filled out in testing electronic components, a BASEDA flowchart, and samples of printouts are provided for illustration. R.D.V.

A77-50459 **Using pattern recognition in product assurance.** R. A. Hughes (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.), M. A. Fischler, and H. E. Rauch (Lockheed Research Laboratories, Palo Alto, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 101-107. 8 refs.

This paper shows how pattern recognition techniques can lead to the solution of problems in product assurance which did not appear to be open to solution using only conventional statistical or mathematical approaches. The techniques described here include conventional statistical analysis as well as discrimination or classification (Fisher linear discriminant), hypothesis generation (minimum spanning tree clustering and centroid clustering), data display (two-dimensional projection), and data base handling and interactive graphics. This paper presents an overview of methods and experience gained in using the above combination of techniques for exploratory data analysis, decision making, and monitoring of manufacturing processes in problems involving product assurance and quality control. (Author)

A78-12614 **Operational influences on avionics reliability.** G. A. Kern (Hughes Aircraft Co., Culver City, Calif.). *Defense Management Journal*, vol. 13, Oct. 1977, p. 17-25. 11 refs.

Four kinds of mean time between failure (MTBF) ratings are distinguished, and the reasons for discrepancies among demonstrated, predicted, required, and field MTBF values are discussed with reference to a study of 16 different avionics equipments now operational on 10 different USAF aircraft types. The primary causes of the discrepancies were found to be the data base used for assessment, and, to a lesser extent, the operational influences of maintenance handling and use. Definitional differences result from the differences in the failure criteria and time base used by the logistic support community, which collects and analyzes the data, and the engineering community, which establishes requirements, performs predictions, and conducts reliability demonstration tests. The contribution of maintenance actions on system interfaces and associated hardware and the significance of nonoperating failures are considered. Modifications of the MTBF calculation procedure are recommended. M.L.

A78-23468 **Reliability and safety - Their significance for science and technology and their influence on industrial civilization (Zuverlässigkeit und Sicherheit - Deren Bedeutung für Wissenschaft und Technik und deren Einfluss auf die industrielle Zivilisation).** W. Gerlach (Bundesanstalt für Materialprüfung, Berlin, West Germany). *Materialprüfung*, vol. 20, Jan. 1978, p. 39-42. In German.

A philosophical analysis of the concepts of safety and reliability is applied to the problem of maintaining the functioning of a safe and reliable industrial civilization which does not intrude on individuality. The analysis, based somewhat on an approach suggested by Carnap, examines reliability engineering, system safety engineering, structural reliability, and material testing. The question of quantitative versus nonquantitative criteria for safety and reliability is considered. M.L.

A78-29486 **Effects of design automation on the reliability and maintainability design of electronic systems.** J. E. Arsenault and P. DesMarais (Computing Devices Co., Ottawa, Canada). *(Society of Reliability Engineers, Annual Canadian Symposium on Reliability Engineering, 4th, Ottawa, Canada, Oct. 13, 14, 1977.) Microelectronics and Reliability,* vol. 17, Jan. 1978, p. 143-153. 12 refs.

Design automation (DA) techniques for sustained performance (reliability) and detection and isolation of faults (maintainability) in electronic systems are described. DA is discussed relative to engineering data base (EDB), design verification, physical design of complex electronic systems, and maintenance and documentation. A set of programs can be interfaced with the EDB to compute the MTBF for any specified design. The discussion presented suggests that a greater awareness of DA techniques and their introduction and practical application provides the key to designing electronic systems with required reliability and maintainability performance. DA is expected to play an increasingly important role in the global problems of system life cycle cost. S.D.

A78-33433 **A new approach to the establishment and maintenance of equipment failure rate data bases.** E. T. Parascos. In: Failure prevention and reliability; Proceedings of the Design Engineering Technical Conference, Chicago, Ill., September 26-28, 1977. New York, American Society of Mechanical Engineers, 1977, p. 263-268.

The paper discusses an optimum approach to real-time equipment-failure reporting, analysis, corrective action, and feedback. Attention is focused on the principles of form development for failure reporting and analysis, use of optical scanning for rapid data input, use of computer time-sharing techniques, and reliability-engineering techniques suitable for establishing equipment-failure rates. Suggestions are made on the development of mechanical and electromechanical equipment failure-rate data bases as well as on the methodology of applying these data bases. Illustrative examples of established failure rate data-base systems in the electrical utility industry are provided. The costs associated with the establishment of an optimum data base using optical scanning and remote time-sharing computer techniques are tabulated. In order to establish, maintain, and perpetuate a failure rate data base, it is imperative to design it with rapid input and retrieval capabilities. S.D.

A79-15290 **Cost effective reliability testing.** A. A. Lakner (FAA, Washington, D.C.), R. T. Anderson, and A. DiGianfilippo (IIT Research Institute, Chicago, Ill.). In: Annual Reliability and Maintainability Symposium, Los Angeles, Calif., January 17-19, 1978, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 271-278. 7 refs.

A program for developing a total methodology and data base for reliability and maintenance as well as cost is examined. The approach seeks to minimize life-cycle cost by reducing support cost by means of improved reliability and maintainability. Reliability specification and testing protocols for ten steps in the procedure are described, and the development of these protocols is discussed. M.L.

N75-18086*# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.

SPACEFLIGHT TRACKING AND DATA NETWORK OPERATIONAL RELIABILITY ASSESSMENT FOR SKYLAB

V. I. Seneca and R. H. Mlynarczyk Apr. 1974 81 p refs

(NASA Order S-70130G; Contract N00017-72-C-4401)

(NASA-CR-139174; CSC-1-395) Avail: NTIS HC $4.75 CSCL 14D

Data on the spaceflight communications equipment status during the Skylab mission were subjected to an operational reliability assessment. Reliability models were revised to reflect pertinent equipment changes accomplished prior to the beginning of the Skylab missions. Appropriate adjustments were made to fit the data to the models. The availabilities are based on the failure events resulting in the stations inability to support a function of functions and the MTBF's are based on all events including 'can support' and 'cannot support'. Data were received from eleven land-based stations and one ship. Author

N76-13818# Naval Avionics Facility, Indianapolis, Ind.

PREDICTION AND OPTIMIZATION OF FAILURE RATES. 200 SERIES (PROF 200) PROGRAMMER'S MANUAL

Paul J. Livers 17 Jun. 1975 98 p refs

(AD-A013208; NAFI-TR-1915) Avail: NTIS CSCL 09/2

This report provides a narrative and details to supplement the 200 Series PRediction and Optimization of Failure Rates (PROF 200) computer program user's manual. PROF 200 was designed to be used by engineers for predicting failure rate and reliability of systems according to the methods of MIL-HDBK-217 and others. The program version described herein is as of 31 May 74. GRA

N76-17423# Southwest Research Inst., San Antonio, Tex.

NONDESTRUCTIVE TESTING DATA SUPPORT CENTER. THE FIRST YEAR Annual Technical Report, 15 Feb. 1974 - 15 Feb. 1975

C. G. Gardner Sep. 1975 59 p

(Contract DSA900-74-C-5268)

(AD-A015593; SwRI-15-3903-1; AMMRC-CTR-75-19) Avail: NTIS CSCL 05/2

The Nondestructive Testing Data Support Center began operating in March, 1974, charged to provide needed support to the DoD Nondestructive Testing Information Analysis Center operated by the Army Materials and Mechanics Research Center, and to meet all requirements of a DoD full-service information analysis center of technical excellence in the field of nondestructive testing. At the close of its first year, all major areas of operation were, with one exception, functioning normally. An Information Support System including currently a total of 7,997 computer retrievable bibliographic data records was established; the ISS employs a Defense RDT and E on-line system remote terminal supported by the Defense Documentation Center. Publication of two current awareness and promotional serials was begun; these are the promotional NTIAC Bulletin, currently distributed free to approximately 4500 recipients and the more technical NTIAC Newsletter, currently distributed to approximately 150 paid subscribers. GRA

N76-28529# White Sands Missile Range, N.Mex.

GIDEP: AN APPROACH TO COORDINATED DATA COLLECTION AND UTILIZATION

Francis M. Nelson 1976 17 p Presented at the European Space Prod. Assurance Symp., Frascati, Italy, 4-6 May 1976

Avail: NTIS HC $3.50

The concept, organization, content, and operation of the Government-Industry Data Exchange Program (GIDEP) is described. GIDEP is concerned with data bases in the fields of part, component or material engineering, failure rates, metrology, failure experience, and aircraft maintenance. Service provided by the program are distribution of alerts, urgent data requests, and electronic test equipment support information. ESA

N76-28530# European Space Agency, Frascati (Italy)

THE ESA DATABANK CONTRIBUTION TO SPACECRAFT RELIABILITY

M. Lombardo 1976 27 p Presented at the European Space Prod. Assurance Symp., Frascati, Italy, 4-6 May 1976

Avail: NTIS HC $4.00

The ESA-Electronic Components Databank (ESA-ECDB) is dealt with as a space components data file. The main function of the ECDB in the space components field is to provide the history of each component type. A computer stored data file is now being produced, containing information about the use of space components in space projects, their presence in qualified and preliminary parts lists and the problems met by each of them (failures, malfunctions). This data is retrievable both in

table form and by means of remote terminals, directly connectable to the central computer either via the telephone switched network or via a dedicated line.
Author (ESA)

N77-13439# Southwest Research Inst., San Antonio, Tex.
NONDESTRUCTIVE TESTING INFORMATION ANALYSIS CENTER: 1975, YEAR OF TRANSITION Annual Technical Report, 15 Feb. 1975 - 15 Feb. 1976
C. G. Gardner May 1976 32 p refs
(Contract DSA900-74-C-5268)
(AD-A024848; SWRI-15-3903(2)) Avail: NTIS HC A03/MF A01 CSCL 05/2

In January 1976 the Department of Defense transferred to Southwest Research Institute full responsibility for operation of the Nondestructive Testing Information Analysis Center (NTIAC), discontinuing the Nondestructive Testing Data Support Center as a separate function. During the reporting period, NTIAC's computerized data file grew to 9,777 records. The NTIAC Newsletter was distributed to 929 recipients, and the Bulletin to 2131 recipients. 75 inquiries (technical, bibliographic, and general) were responded to. A state-of-the-art survey on electromagnetic acoustic transducers was published. Under Air Force sponsorship a Workshop on Nondestructive Evaluation of Residual Stress was conducted, the Proceedings to be published. NTIAC's RDT and E remote terminal was upgraded to secure status, giving NTIAC on-line access to classified records in DDC's TR file.
Author (GRA)

N77-31522# Southwest Research Inst., San Antonio, Tex.
NONDESTRUCTIVE TESTING INFORMATION ANALYSIS CENTER, 1976 Annual Technical Report, 15 Feb. 1976 - 15 Feb. 1977
W. W. Bradshaw, F. P. Hicks, R. R. King, and R. T. Smith Jun. 1977 32 p
(AD-A041262; SWRI-15-3903(3)) Avail: NTIS HC A03/MF A01 CSCL 05/2

During the contract year, a total of approximately 12,000 entries have been reached in NTIAC's computerized data file records. The NTIAC Newsletter has a distribution of approximately 3,000 recipients. A State-of-the-Art Survey on Advanced Ultrasonic Testing Systems was published. NTIAC responded to over 100 technical inquiries.
Author (GRA)

N78-10487*# Aerospace Corp., El Segundo, Calif. Advanced Programs Div.
RELIABILITY MEASUREMENT DURING SOFTWARE DEVELOPMENT Final Report
H. Hecht, W. A. Sturm, and S. Trattner Sep. 1977 100 p refs
(Contract NAS1-14392)
(NASA-CR-145205; ATR-77(7590)-2) Avail: NTIS HC A05/MF A01 CSCL 14D

During the development of data base software for a multi-sensor tracking system, reliability was measured. The failure ratio and failure rate were found to be consistent measures. Trend lines were established from these measurements that provided good visualization of the progress on the job as a whole as well as on individual modules. Over one-half of the observed failures were due to factors associated with the individual run submission rather than with the code proper. Possible application of these findings for line management, project managers, functional management, and regulatory agencies is discussed. Steps for simplifying the measurement process and for use of these data in predicting operational software reliability are outlined.
Author

N78-10982# Purdue Univ., Lafayette, Ind. Lab. for Applied Industrial Control.
USER'S MANUAL FOR GRASP (GRAPHICAL RELIABILITY ANALYSIS PROGRAM)
Joseph Polino, Jr. and Clifford C. Peterson Apr. 1976 239 p refs
(Grant NSF ATA-73-07822-A01)
(PB-269839/1; NSF/RA-760597; Rept-75; Bull-143) Avail: NTIS HC A11/MF A01 CSCL 14D

The Grasp program is a computer simulation approach to solving problems in which the failure and end of repair events are modeled according to the probability laws of the individual components of the system. The modeling philosophy of Grasp (and Gerts) is that reliability configurations can be represented as network diagrams on which the parameters and logical relationships are specified. This network then is easily converted into a set of data cards. No programming is required. A notation that is an extension of block diagrams commonly used in reliability work, is presented. From these diagrams, the preparation of equivalent Grasp networks is a straightforward process. Grasp is a collection of Ansi FORTRAN subprograms, and the user is required to have only a FORTRAN compiler, a line printer, and disk storage.
GRA

N78-29480# Raytheon Co., Huntsville, Ala. Dept. of Life Cycle Analysis.
STORAGE RELIABILITY OF MISSILE MATERIEL PROGRAM, SWITCH ANALYSIS Final Report, Jun. 1974 - Jan. 1978
Dennis F. Malik Redstone Arsenal, Ala. Army Missile Res. and Develop. Command Feb. 1978 28 p refs
(Contract DAAK40-74-C-0853)
(AD-A053414; LC-78-EM4) Avail: NTIS HC A03/MF A01 CSCL 09/3

This report documents findings on the non-operating reliability of switches. Long term non-operating data has been analyzed and reliability predictions have been developed for switches. This report is a result of a program whose objective is the development of non-operating (storage) reliability prediction and assurance techniques for missile materiel. The analysis results will be used by U.S. Army personnel and contractors in evaluating current missile programs and in the design of future missile systems.
Author (GRA)

N78-29484# National Technical Information Service, Springfield, Va.
INFRARED TECHNIQUES FOR NONDESTRUCTIVE TESTING. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Mar. 1978
Guy E. Habercom, Jr. Apr. 1978 111 p 2 Vol.
(NTIS/PS-78/0358/8) Avail: NTIS HC $28.00/MF $28.00 CSCL 14B

A bibliography containing 106 abstracts concerning the fundamental principles of nondestructive testing and inspection, by use of infrared devices, is presented. Tire flaws, electronic circuit defects, and flaws in bonded surfaces are among the applications researched.
GRA

N78-29485# National Technical Information Service, Springfield, Va.
INFRARED TECHNIQUES FOR NONDESTRUCTIVE TESTING. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Mar. 1978
Guy E. Habercom, Jr. Apr. 1978 105 p 2 Vol.
(NTIS/PS-78/0359/6) Avail: NTIS HC $28.00/MF $28.00 CSCL 14P

A bibliography containing 90 abstracts concerning the fundamental principals of nondestructive testing and inspection, by use of infrared devices, is presented. Tire flaws, electronic circuit defects, and flaws in bonded surfaces are among the applications researched.
GRA

N79-11422# Naval Postgraduate School, Monterey, Calif.
NONPARAMETRIC ESTIMATION FROM CENSORED DATA Ph.D. Thesis
Lee Won Hyung Mar. 1978 76 p refs
(AD-A056332) Avail: NTIS HC A05/MF A01 CSCL 14/4

For nearly two decades there has been an intensive development of a statistical methodology for assessing length of life and reliability of performance from empirical data. The initial stimulus for research on statistical problems in life testing and reliability came from the need to answer pressing practical questions which could not be treated by the existing statistical techniques. Because life and performance tests are so time consuming and expensive to run, it is a practical necessity to terminate them as soon as possible. For the statistician this means developing estimation and developing estimation and decision procedure for data, which are severely curtailed in one way or another long before all items on test have actually failed.

The estimation is more complicated when the data are truncated, i.e., when the observer loses track of some individuals before death occurs. The product limit method Kaplan and Meier is one way of estimating p(t) when the mechanism causing truncation is independent of the mechanism causing death. This paper proposes alternative estimators and compares them to the product limit method. A computer simulation is used to generate the times of death and truncation from a variety of assumed distributions. No single estimator gives the best fit to the 'true' distribution of death under all situations. However, other estimators are shown to be better than the product limit estimator under all of the assumed situations. GRA

N79-22533# Army Construction Engineering Research Lab., Champaign, Ill.

PROCEDURES FOR COLLECTION OF RELIABILITY AVAILABILITY, AND MAINTAINABILITY DATA ON ELECTRICAL AND MECHANICAL SYSTEMS

Edward M. Takemori and M. J. Pollock Jan. 1979 60 p refs
(DA Proj. 4A7-63734-DT-08)
(AD-A064857; CERL-SR-E-137) Avail: NTIS
HC A04/MF A01 CSCL 05/2

This report presents the results of a study of methods to acquire and store data on the reliability, availability, and maintainability (RAM) of electrical and mechanical systems. Data acquisition methods previously used by the Corps of Engineers were reviewed and new methods and equipment now being developed were evaluated. Forms are proposed to aid in the collection and handling of information in a logical manner. Methods for storing data either manually or by computer are also presented. The results show that new computer systems, together with available communications equipment and the proposed forms, can be combined to provide an efficient and economical means of acquiring and storing RAM data. Author (GRA)

N79-27529# Southwest Research Inst., San Antonio, Tex.

NONDESTRUCTIVE TESTING INFORMATION ANALYSIS CENTER, 1978 Annual Technical Report, 15 Feb. 1978 - 15 Feb. 1979

Richard T. Smith May 1979 37 p refs
(Contract DLA900-77-C-3733)
(AD-A068669; SWRI-15-4823) Avail: NTIS
HC A03/MF A01 CSCL 05/2

During the reporting period, NTIAC's computerized data file grew to 15,318 records. The NTIAC Newsletter was distributed to over 4000 recipients. Ninety-nine inquiries (technical, bibliographic, and general) were responded to. Publications included a Critical Review on Liquid Crystals for Nondestuctive Evaluation and a State of the Art Survey on Automated Radiography. Drafts of a critical review on magnetic leakage methods and a state of the art survey on Barkhausen NDE have been prepared. GRA

N80-19632# Thomson-CSF, Malakoff (France).

METHODS USED FOR DISCERNING THE RELIABILITY OF MILITARY AIRCRAFT RADAR [METHODES UTILISEES POUR CONNAITRE LA FIABILITE D'UN RADAR D'AVION D'ARMES]

J. C. Charlot *In* AGARD Avionics Reliability, Its Tech. and Related Disciplines Oct. 1979 20 p In FRENCH

Avail: NTIS HC A22/MF A01

In an effort to ascertain the reliability of a radar onboard a military aircraft, Thomson-CFS formed an organization to collect and process the information necessary to measure the mean time of good operation. The methods for data acquisition, the members of the organization in 1979, the data management, and prospects for the future (extension to other equipment and information concerning component fabrication) are discussed. Transl. by A.R.H.

N80-28737# Battelle Columbus Labs., Ohio. Tactical Technology Center.

A QUALITY CONTROL DATA MANAGEMENT SYSTEM Final Report, Jun. 1977 - Feb. 1978

M. B. Neher and R. E. Heffelfinger 28 Feb. 1978 113 p
(Contract DAAK40-73-C-0142)
(AD-A084896; BATT-CDIR-1-2; DRXTH-TD-CR-80069) Avail:
NTIS HC A06/MF A01 CSCL 09/2

A laboratory quality control system has been programmed for the Hewlett-Packard 3384 Computer used in Installation Restoration analytical chemistry laboratories. GRA

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

A76-22578 **Recent developments in finite element modeling.** E. L. Stanton (McDonnell Douglas Astronautics Co., Huntington Beach, Calif.). In: Society of Engineering Science, Annual Meeting, 12th, Austin, Tex., October 20-22, 1975, Proceedings. Austin, University of Texas, 1975, p. 711-716. 10 refs.

Recent efforts in the aerospace industry to improve the data base and construction methods available for finite element modeling are reviewed. It is maintained that, due to the trend toward isoparametric finite elements, conventional grid point modeling should be expanded to include finite line, surface, and volume models. This will permit large reductions in input data requirements through construction operations using these models, and will bring the analysis, design, and manufacturing phases of engineering closer to a common data base. B.J.

A78-33426 **Failure prevention and reliability; Proceedings of the Design Engineering Technical Conference, Chicago, Ill., September 26-28, 1977.** Conference sponsored by the American Society of Mechanical Engineers. Edited by S. B. Bennett (Westinghouse Electric Corp., Steam Turbine Div., Philadelphia, Pa.), A. L. Ross (General Electric Co., Re-entry and Environmental Systems Div., Philadelphia, Pa.), and P. Z. Zemanick (Westinghouse Electric Corp., Advanced Reactors Div., Madison, Pa.). New York, American Society of Mechanical Engineers, 1977. 309 p. $30.

A collection of papers is presented on reliability assurance in practice, failure analysis, techniques for failure prevention and assessment, and equipment reliability as to state of the art and research needs. Emphasis is placed on analysis and redesign based on actual service failures, failure criteria, reliability assessment techniques and their application, failure prevention by means of stress analysis and failure-prevention programs. Topics of interest include failure of an experimental gas turbine rotor, prediction of mechanical design reliability using weighted fault trees, and design control and risk management. S.D.

N75-12362 Bell Aerosystems Co., Buffalo, N.Y. Structural Systems Dept.

A DISCRETIZED PROGRAM FOR THE OPTIMAL DESIGN OF COMPLEX STRUCTURES

James R. Batt and Ronald A. Gellatly *In* AGARD Structural Optimization Sep. 1974 15 p refs

More economical and more flexible procedures for structural optimization of large scale systems have been sought. A new approach to determine the minimum weight of such systems has been developed, is discrete in nature, and is labeled the sieve-search technique. An essential element of the technique is the use of data banks which contain minimum weight and associated geometry of structural components. These banks are generated using classical methods of optimization. An additional facet of the technique is the use of simplified engineering analysis methods during the redesign phase of the optimization cycle.

Herein lies the efficiency of the sieve-search technique. The method was successfully applied to the design of an extensive class of surface effect vehicles and is shown through application to the design of thermal protective systems and associated wing substructure. Author

N76-27416# Eidgenoessische Technische Hochschule, Zurich (Switzerland).
THE SPACE DATA BANK AS AN INSTRUMENT FOR THE CONSTRUCTION PLANNER WITH UNIVERSITY BUILDINGS AS AN EXAMPLE Ph.D. Thesis [DIE RAUMDATENBANK ALS INSTRUMENT DES BAUTRAEGERS DARGESTELLT AM BEISPIEL DES HOCHSCHULBAUES]
Georg Heinrich Steiner 1974 104 p In GERMAN
(Rept-5072) Avail: NTIS HC $5.25

A data bank system is reported for construction planners and architects that encompasses the basic principles of industrial quality, work space requirements and demands, and funding. Example calculations for planning an university complex by computer techniques contain definitions for projection, construction, appropriations, usage, requirements analysis, and programming. Transl. by G.G.

N76-15606# Naval Ship Research and Development Center, Bethesda, Md.
DATA GENERATION FOR FINITE-ELEMENT STRUCTURAL ANALYSIS OF THREE-DIMENSIONAL NAVAL SHIP STRUCTURES
Paul M. Meyer Jun. 1975 86 p
(SF43422703)
(AD-A014125; NSRDC-4637) Avail: NTIS CSCL 13/10

A computer program has been developed to automatically discretize three-dimensional structures consisting of combinations of cross-stiffened grillages. Discretizing is dividing a continuous structure into a number of connected parts so that the sum of the collection of parts equals the total structure. The purpose of this computer program is to shorten the preliminary work time involved in preparing data for analysis by the finite-element method. The grillages can have multiple openings with coamings, and the computer program can also generate the cards that describe inplane and normal uniform loads. Input to the program consists of punched cards which define structural geometry, boundary conditions, and loadings. Output consists of a disk file which can be read directly either by NASTRAN or by a special utility program to produce plots of the discretized structure. Access can also be obtained at a later time by a special purpose program which displays the discretized structure at an interactive graphics terminal. The validated data can then be made accessible to NASTRAN for a finite-element analysis. Modifications to this program will extend the current capability of the program for discretizing from simple warped surfaces to more complex curved surfaces and will allow use of the program on either a UNIVAC-1108 or an IBM-360/91 computer. Author (GRA)

N77-10281*# Battelle Columbus Labs., Ohio.
THE STAGING SYSTEM: DISPLAY AND EDIT MODULE

Ed Edwards and Leo Bernier (AFFDL) *In* NASA. Langley Res. Center Advan. in Eng. Sci., Vol. 2 1976 p 543-553 refs

Avail: NTIS HC A20/MF A01

The Display and Edit (D and E) Module described is one of six major modules being developed for the STAGING (STructural Analysis through Generalized INteractive Graphics) System. Several remarks are included concerning the computer environment and the architecture of the data base. The utility of this module is emphasized. Author

N78-10616# Naval Research Lab., Washington, D.C. Shock and Vibration Information Center.
THE SHOCK AND VIBRATION DIGEST, VOLUME 9, NUMBER 7
Ronald L. Eshleman, Judith Nagle-Eshleman, Milda Tamulionis, R. Belsheim, and R. L. Bort Jul. 1977 90 p
(AD-A042522) Avail: NTIS HC A05/MF A01 CSCL 05/2

Various articles, book reviews, short courses, news briefs, and current abstracts dealing with sound, shock, and vibration technology are presented. Articles included are: (1) Techniques for the Design of Highly Damped Structures; (2) A Review of Ship Hull Vibration, Part Four: Comparison of Beam Models; and (3) Underwater Fluid Structure Interaction, Part Four: Hydrodynamically Applied Forces (Moving Medium). G.D.H.

N78-20483# Agbabian Associates, El Segundo, Calif.
SUMMARY OF OPERATIONS. DNA MASTER FILE OF GROUND-SHOCK, AIR-BLAST, AND STRUCTURE-RESPONSE DATA Final Report, 1 Oct. 1976 - 30 Sep. 1977
James A. Malthan and K. Thomas Dill 22 Sep. 1977 222 p refs
(Contract DNA001-76-C-0100)
(AD-A053390; AD-E300184; AA-R-7624-6-4443;
DNA-4374F) Avail: NTIS HC A10/MF A01 CSCL 09/2

The document presents examples of data processing that were requested by users of the Defense Nuclear Agency Archive of high-explosive test data. Guidelines are also presented that enable data analysts to estimate the computer hours and labor hours that will be required to perform certain typical data processing operations. Author (GRA)

N78-32487*# Northrop Corp., Beverly Hills, Calif.
COMPARISON OF SEVERAL NASTRAN ANALYTICAL TECHNIQUES FOR LARGE STRUCTURES
David T. Zemer *In* NASA. Marshall Space Flight Center Seventh NASTRAN User's Colloq. Oct. 1978 p 355-363 refs

Avail: NTIS HC A21/MF A01 CSCL 20K

In order to plan for the finite element structural analysis of future aircraft, five static analysis techniques using the MacNeal-Schwendler Corporation version of NASTRAN were evaluated. The structure was analyzed as: (1) a single model with a symmetric loading condition; (2) a single model with symmetric/nonsymmetric loading conditions; (3) three substructures in three phases using tape storage with a symmetric loading condition; (4) three superelements using data base storage with a symmetric loading condition; and (5) three superelements using data base storage with cyclic symmetry for symmetric/nonsymmetric loading conditions. The superelement techniques proved superior to the single model approaches by reducing computer time for redesign work by as much as 70 percent. J.A.M.

N79-10482*# MARC Analysis Research Corp., Palo Alto, Calif.
STRUCTURAL ANALYSIS CONSULTATION USING ARTIFICIAL INTELLIGENCE
R. J. Melosh, P. V. Marcal, and Les Berke (Flight Dynamics Lab., Wright-Patterson AFB, Ohio) *In* NASA. Langley Res. Center Res. in Computerized Structural Analysis and Syn., Oct. 1978 p 175-194 refs

Avail: NTIS HC A10/MF A01 CSCL 20K

The primary goal of consultation is definition of the best strategy to deal with a structural engineering analysis objective. The knowledge base to meet the need is designed to identify the type of numerical analysis, the needed modeling detail, and specific analysis data required. Decisions are constructed on the basis of the data in the knowledge base - material behavior, relations between geometry and structural behavior, measures of the importance of time and temperature changes - and user supplied specifics characteristics of the spectrum of analysis types, the relation between accuracy and model detail on the structure, its mechanical loadings, and its temperature states. Existing software demonstrated the feasibility of the approach, encompassing the 36 analysis classes spanning nonlinear, temperature affected, incremental analyses which track the behavior of structural systems. G.G.

N79-21420*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TESTS OF BEADED AND TUBULAR STRUCTURAL PANELS
John L. Shideler, Roger A. Fields, and Lawrence F. Reardon *In its* Recent Advan. in Structures for Hypersonic Flight, Pt. 2 1978 p 538-578 refs Prepared in cooperation with NASA/Dryden Flight Res. Center
Avail: NTIS HC A18/MF A01 CSCL 20K

Two efficient concepts built from curved elements were identified, and a data base for tubular panels was developed. The tubular panel failure modes were understood, and the data base for these panels indicated that their performance can be predicted. The concepts are currently being tested in a realistic builtup structure; 157 room temperature tests and 67 hot tests were made with no structural failures, although all of these tests were not at the design load of the structure. J.A.M.

N79-28434# Argonne National Lab., Ill.
EFFECTS OF NOTCHES ON ELEVATED-TEMPERATURE, LOW-CYCLE FATIGUE BEHAVIOR OF TYPE 304 STAINLESS STEEL
D. T. Raske and P. S. Maiya Dec. 1978 23 p refs Presented at ASME meeting, San Francisco, 10 Dec. 1978
(Contract W-31-109-eng-38)
(CONF-781202-25) Avail: NTIS HC A02/MF A01

Results of an investigation into the effects of geometric stress concentrations on the elevated-temperature low-cycle fatigue behavior of type 304 stainless steel are presented. The objective was to develop a data base that could be used to verify the ASME Code Case 1592-8 design method for predicting the creep-figure behavior of structural components which contain discontinuities. In continuous cycling tests, the local strains at the notch root determined from the Code Case procedure result in fatigue life estimates that were conservative when compared to the experimental values. For tests containing a hold time at the peak tensile strain, the Code Case procedure resulted in local strains that were nearly identical to the experimentally obtained local strains, if the local stress was assumed to relax to the nominal value during the hold time. DOE

N80-11520# Sandia Labs., Albuquerque, N. Mex.
ASSESSMENT OF STRESS-STRAIN DATA SUITABLE FOR FINITE-ELEMENT ELASTIC-PLASTIC ANALYSIS OF SHIPPING CONTAINERS
H. J. Rack and Gerald A. Knorovsky Sep. 1978 89 p refs
(Contract EX-76-C-04-0789)
(NUREG-CR-0481; SAND-77-1872; R-7) Avail: NTIS

Stress-strain data which describes the influence of strain rate and temperature on the mechanical response of materials presently being used for light water reactor fuel shipping containers have been assembled. Selection of data has been limited to that which is suitable for use in finite-element elastic-plastic analysis of shipping containers (e.g., they must include complete material history profiles). Based on this information, recommendations were made for further work which is required to complete the necessary data base. DOE

N80-24881*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
APPLICATION OF A DATA BASE MANAGEMENT SYSTEM TO A FINITE ELEMENT MODEL
James L. Rogers, Jr. *In* NASA. Goddard Space Flight Center Eighth NASTRAN User's Colloq. May 1980 p 223-234

Avail: NTIS HC A11/MF A01 CSCL 20K

In today's software market, much effort is being expended on the development of data base management systems (DBMS). Most commercially available DBMS were designed for business use. However, the need for such systems within the engineering and scientific communities is becoming apparent. A potential DBMS application that appears attractive is the handling of data for finite element engineering models. The applications of a commercially available, business-oriented DBMS to a structural engineering, finite element model is explored. The model, DBMS, an approach to using the DBMS, advantages and disadvantages are described. Plans for research on a scientific and engineering DBMS are discussed. R.E.S.

42 GEOSCIENCES (GENERAL)

A78-14830 # **Potential applications of digital, visible, and infrared data from geostationary environmental satellites.** D. B. Miller, M. P. Waters, III, J. D. Tarpley, R. N. Green, and D. C. Dismachek (NOAA, National Environmental Satellite Service, Washington, D.C.). In: International Symposium on Remote Sensing of Environment, 11th, Ann Arbor, Mich., April 25-29, 1977, Proceedings. Volume 2. Ann Arbor, Mich., Environmental Research Institute of Michigan, 1977, p. 849-858.

The National Environmental Satellite Service (NESS) is experimenting with an hourly, digital data base from the Visible/Infrared Spin-Scan Radiometer (VISSR) instrument on the GOES-1 and SMS-2 geostationary satellites. The general characteristics of this experimental VISSR data base (VDB) are described. Several examples of developmental applications of these quantitative digital data are presented. These include a review of recent attempts to develop products that are of use to meteorologists who provide services to aviation, agriculture, forestry, hydrology, oceanography, and climatology. The sample products include high resolution thermal gradients of land and ocean surfaces, thermal change analyses, fruit frost/freeze application, cloud-top altitude analysis, analysis of hurricane characteristics, and analyses of solar insolation. (Author)

N80-20070# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
REPORTS ON CARTOGRAPHY AND TOPOGRAPHICAL MEASUREMENTS. SERIES 2: TRANSLATIONS
1978 127 p refs
(Rept-35) Avail: NTIS HC A07/MF A01

Eleven texts are presented concerning automated displacement of point and line features in cartographic generalization, a digital terrain model for large surfaces and direct storage access, photomapping tidal flat areas, testing the accuracy of cartographic equipment, color separation, locational characteristics and computer assisted cartographic generalization, computer assisted thematic mapping, digitizing geometric data for thematic mapping, and some programs for the transformation of the contents of available maps according to different map projections.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

A76-28055 **The future of human computer processed ERTS MSS data in resource inventory, mapping and assessment.** J. D. Nichols (California, University, Berkeley, Calif.). In: Remote sensing of earth resources. Volume 4 - Proceedings of the Fourth Annual Conference on Earth Resources, Tullahoma, Tenn., March 24-26, 1975. Tullahoma, University of Tennessee, 1975, p. 69-76.

The organization of an interdisciplinary, inter-agency renewable resource survey, inventory and mapping system based on computer analyzed Landsat multispectral scanner data is described. The characteristics of this cost-effective system are broad uniform data base, suitable spatial and spectral resolution, direct computer compatibility, periodic and systematic coverage and geometric fidelity. A brief description is given of the steps that would be used for inventory, assessment and mapping of the renewable resources using Landsat data. B.J.

A76-29094 **Digital correction of ERTS MSS bulk data for high resolution image data base.** S. Murai (Tokyo, University, Tokyo, Japan). In: Remote sensing of earth resources. Volume 4 - Proceedings of the Fourth Annual Conference on Earth Resources, Tullahoma, Tenn., March 24-26, 1975. Tullahoma, University of Tennessee, 1975, p. 735-742.

The digital correction of LANDSAT multispectral scanner data of Japan is discussed. The aim of the paper is to specify the selection of control points, to compare the accuracy for different numbers of points, to compare the accuracy of different conversion models and to establish the LANDSAT image data base. Geometric and geographic correction are carried out using five types of polynomials for three different numbers (45, 35 and 25) of control points which are selected on both the LANDSAT digital map and the 1: 50,000 national base map of Japan. Accuracies for these cases were compared in the LANDSAT frame of Tokyo districts and found to be less than one pixel RMS. B.J.

A76-31471 # **Presenting the results of a regional survey for West-Sumatra by computer mapping.** K. Volger (Umwelt-Data GmbH, Offenbach, West Germany). In: Symposium on Earth Survey, Porz-Wahn, West Germany, April 7-11, 1975, Reports. Cologne, Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt, 1975, p. 653-662.

The characteristics of computer mapping and spectral pattern recognition are examined, and the cellular computer mapping approach, using 1-sq km cells, is described and demonstrated by examples. The degree of generalization is shown to be similar to that of automatic ERTS processing; however, many more (economical and sociological) sectors can be covered. The resulting maps are very similar to thematic maps from multispectral scanners using computer-aided spectral pattern recognition techniques. V.P.

A76-33177 # **Montana public land resource management applications of remote sensing.** M. P. Meyer, B. H. Gerbig, J. A. Brass (Minnesota, University, Minneapolis, Minn.), H. R. Cosgriffe, and F. T. Batson (U.S. Department of the Interior, Bureau of Land Management, Billings, Mont.). In: Symposium on Remote Sensing and Photo Interpretation, Banff, Alberta, Canada, October 7-11, 1974, Proceedings. Volume 1. Ottawa, Canadian Institute of Surveying, 1975, p. 5-15. 6 refs. Research supported by the U.S. Department of the Interior and University of Minnesota.

To meet the increasing demands for information on the public land resources in the face of inadequate budgets and personnel, remote sensing was selected by the USDI - Bureau of Land Management's Montana State Office to increase the capabilities of existing professional personnel. A 5-year series of field tests and training, has resulted in: (1) a 'low-stage' inexpensive 35 mm aerial photography system now in use for monitoring range trend, wildlife habitat, water quality, erosion, structures, timber sales and archeological sites, (2) a 'middle-stage' system of 1:40,000-1:50,000 scale color infrared 23 x 23 cm photography for use as a data base for large area (circa 50,000 to 250,000 hectares) resource surveys, and (3) a 'high-stage' system of color infrared small scale 1:80,000 to 1:100,000 'quad-centered' photography applied to very large areas (circa 250,000 hectares) for use as an extensive resource survey data base. The applicability of ERTS data is also under study. (Author)

A76-33203 # **Remote sensing applications for geoecological studies in the high mountain environment.** H. Haefner (Zurich, Universitat, Zurich, Switzerland). In: Symposium on Remote Sensing and Photo Interpretation, Banff, Alberta, Canada, October 7-11, 1974, Proceedings. Volume 1. Ottawa, Canadian Institute of Surveying, 1975, p. 349-361. 10 refs.

Remote sensing data acquisition, interpretation, and organization for geoecological studies in high mountains are discussed for two test areas in Switzerland. The paper outlines data acquisition techniques for collection of various thematic groups of surface features using different remote sensors, interpretation methods for inventory and combination of the data obtained, and organization of the data in geographical information systems for comparison and useful application in geoecological studies. First results of data handling and data output for the two test areas are presented. Major conclusions are that various remote sensing systems are needed for data acquisition, that additional information from ground observation and other sources are important, and that a computerized geographical information system that stores the coded data in matrix form and allows geographical location of each single information provides the best basis for further processing and correlation. S.D.

A76-35083 # **Louisiana Comprehensive Planning Information System - Compilation and utilization of the data base.** E. L. Schwertz, Jr. (Louisiana State Planning Office; Louisiana State University, Baton Rouge, La.). In: International Symposium on Remote Sensing of Environment, 10th, Ann Arbor, Mich., October 6-10, 1975, Proceedings. Volume 2. Ann Arbor, Mich., Environmental Research Institute of Michigan, 1975, p. 873-877. 7 refs.

The development of a computer oriented planning information system, the Comprehensive Planning Information System (CPIS), by the Louisiana State Planning Office is presented. A brief description of the types of sociodemographic data stored in CPIS is covered. Considerable detail is devoted to the Land Use and Data Analysis (LUDA) Program of the U.S. Geological Survey (USGS) as it pertains to a cooperative agreement between the Louisiana State Planning Office and the Geography Program of USGS. Also reported is an account of the successful use made of the computerized land use data when merged with flood delineations obtained from Landsat satellite imagery to provide flood maps and tabulations. Computerization of soils association data for storage in CPIS and the potential for producing thematic soils limitation/suitability maps is presented. Examples of the use of data presently stored on CPIS, as well as projected uses for CPIS data, are listed. (Author)

A76-38510 **Information system for aerial photographs.** J. D. McLaurin (U.S. Geological Survey, National Cartographic Information Center, Reston, Va.). In: American Society of Photogrammetry and American Congress on Surveying and Mapping, Fall Convention, Phoenix, Ariz., October 26-31, 1975, Proceedings. Falls Church, Va., American Society of Photogrammetry, 1976, p. 154-161.

A computer-based summary record information system for aerial photographs is developed as a data management tool which provides information only on the geographical extent and general characteristics of a photo project rather than identifying individual frames. It is possible to enter the system with data formatted by grid cell or by county. Output from the summary record takes three forms: a computer-printed graphic, a listing of the detailed summary record for each quadrangle represented on the graphic, and geographic catalogs of the summary records for all agencies. Other standard graphics are presently being designed that would serve most users. S.D.

A76-39075 **The new adjustment of the North American Horizontal Datum.** J. D. Bossler (NOAA, Office of National Geodetic Survey, Washington, D.C.). *EOS*, vol. 57, Aug. 1976, p. 557-562. 15 refs.

The paper describes the main goal and technical features of a project for defining a new datum of horizontal control, called the North American Datum. The new datum will not be related to a single point, as was done in the original North American 1927 Datum, but to numerous stations whose positions have been determined from satellites or other superprecise methods. These stations will be introduced into the adjustment as observed values, assigned appropriate weights, and permitted to accept corrections. A report is given on the status of processing triangulation for the new adjustment, and the enormity of the task of processing several hundred thousand observations is outlined. The problem of determining the accuracy of the observations is discussed along with the nature of planned field operations and international participation. P.T.H.

A77-13219 **Digital sensor simulation.** M. B. Faintich (Defense Mapping Agency, Aerospace Center, St. Louis Air Force Station, Mo.). *Photogrammetric Engineering and Remote Sensing*, vol. 42, Nov. 1976, p. 1427-1440.

The paper describes the physical models used and examples simulated with a digital radar simulation computer software. The software is written from the viewpoint of utilizing the sensor required information contained in the data bases. The simulations require two input data bases, with both data bases registered in an array format. Radar scenes were simulated utilizing digital culture and terrain data bases. Parameters affecting radar simulations and comparisons of actual and simulated scenes are presented. The results indicate that digital data bases can be used to effectively simulate radar scenes. The computer program is shown to be a valuable editing and analysis tool for the production of digital data bases. Numerous photographs supplement the text. S.D.

A77-15058 **Resource inventory using Landsat data for areawide water quality planning.** R. N. Schecter (Triangle J Council of Governments, Research Triangle Park, N.C.). In: Symposium on Machine Processing of Remotely Sensed Data, Purdue University, West Lafayette, Ind., June 29-July 1, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 1B-1 to 1B-10. 8 refs.

The Triangle J Council of Governments (Triangle J is located in the eastern portion of the North Carolina Piedmont) used Landsat imagery to provide an essential data base for water quality inventory in the area as well as for input data for modeling water quality and future development patterns. Water quality inventory was obtained for the 1,750 sq mile study area through the computer processing of Landsat computer compatible tapes. Ten land cover categories were interpreted at a detail of 0.44 hectares and included three developed categories, four forest types, agricultural managed lands, bare soil and water. The resulting products included color-coded overlays for each category at a ratio scale of 1:96,000, a color composite map of all categories at the same scale, and a computer tape containing land cover data for each 54 USGS 7-1/2 minute quadrangles by 50 m grid cells. B.J.

A77-18973 **Assessment of upper Mississippi River flood-plain changes with sequential aerial photography.** K. N. Olson and M. P. Meyer (Minnesota, University, St. Paul, Minn.). In: American Society of Photogrammetry, Annual Meeting, 42nd, Washington, D.C., February 22-28, 1976, Proceedings. Falls Church, Va., American Society of Photogrammetry, 1976, p. 167-177. 5 refs. Army-sponsored research.

A77-27855 # **Intermediate scale mapping for resource managers.** S. J. Hathorn (U.S. Department of the Interior, Bureau of Land Management, Denver, Colo.). In: American Society of Photogrammetry, Annual Meeting, 43rd, Joint Symposium on Land Data Systems, Washington, D.C., February 27-March 5, 1977, Proceedings. Symposium co-sponsored by the American Congress on Surveying and Mapping. Falls Church, Va., American Society of Photogrammetry, 1977, p. 566-572. (ASP 77-264)

The paper gives a brief description of the content and format of two intermediate scale color map editions that portray twenty-two categories of surface ownership and six categories of surface or subsurface mineral rights in addition to base map data. Information on availability of the editions is given. P.T.H.

A77-45756 # **Forest fire fuel mapping from Landsat.** M. Goldberg (Ottawa, University, Ottawa, Canada) and P. Kourtz (Department of Environment, Forest Fire Research Institute, Ottawa, Canada). *COSPAR, Plenary Meeting, 20th, Tel Aviv, Israel, June 7-18, 1977, Paper.* 6 p.

The present paper deals with the design of a system which uses Landsat imagery to plot and update forestry maps for forest fire control purposes. The data contained in the maps are intended for use as input data to a computer forest fire control model. The computer maps will supply up-to-date information on forest cover with regard to fuel type, as well as information on forest resources, roads, and slash areas. The relevant properties of Landsat are briefly outlined, and earlier Landsat-based experiments are reviewed. A design of a computer data base system for using Landsat imagery for the purposes under consideration is proposed. V.P.

A77-47445 **Advances in digital sensor simulation.** M. B. Faintich (Defense Mapping Agency, Aerospace Center, St. Louis, Mo.). In: American Society of Photogrammetry and American Congress on Surveying and Mapping, Fall Convention, Seattle, Wash., September 28-October 1, 1976, Proceedings. Falls Church, Va., American Society of Photogrammetry, 1976, p. 293-302.

Use of digital data bases to simulate radar patterns with indication of land-use data (culture and terrain data) and for the simulation of sensor performance is described. The program is recommended as a valuable editing and analysis tool for production and refinement of digital data bases. The data bases are intended for support to F-111A simulators, providing an improved low-level radar training capability with digitally generated radar landmass images. Generation of reference scenes from this or other data bases is considered for microwave radiation sensors and low-light-level television sensors. R.D.V.

A78-12932 # **User experience with the applications of Landsat data.** G. Thorley (U.S. Geological Survey, Reston, Va.) and D. Hood (U.S. Geological Survey, Sioux Falls, D. Dak.). In: International Electronics Congress, 24th, Rome, Italy, March 28-30, 1977, Proceedings. Rome, Rassegna Internazionale Elettronica Nucleare ed Aerospaziale, 1977, p. 63-71.

The use of Landsat data in resource assessment and management is discussed, with attention given to cost analysis of the interpretive techniques, as well as to technical problems such as inadequate resolution of the imagery or infrequent coverage of an area. Projects involving forest inventories, the inspection of water impounded by dams, the detection of geologic structures corresponding to mineral, petroleum or natural gas deposits, and crop monitoring are considered. Limitations of Landsat data arising from the presence of cloud cover or the deficiencies of the multispectral scanning apparatus are also mentioned. J.M.B.

A78-14890 # **Development of an integrated data base for land use and water quality planning.** J. Adams, C. VanSchayk (Toledo Metropolitan Area Council of Governments, Toledo, Ohio), and L. B. Istvan (Michigan, Environmental Research Institute, Ann Arbor, Mich.). In: International Symposium on Remote Sensing of Environment, 11th, Ann Arbor, Mich., April 25-29, 1977, Proceedings. Volume 2. Ann Arbor, Mich., Environmental Research Institute of Michigan, 1977, p. 1381-1386.

The Land Resource Information System has been developed by the Toledo Metropolitan Area Council of Governments for the evaluation of the role played by various land resources in water quality management. The system uses a computer-based data program, and has been tested in areas of Ohio and Michigan. Its applications include: the abatement of runoff from agricultural land, the mapping of septic tank capability based on soil data, the determination of an area's capability for underground sewage treatment facilities, land development planning, the design of resource management systems, and the functional characterization of natural regions and features. S.C.S.

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A78-26181 * # **The Seasat algorithm development facility at JPL.** J. W. Brown and R. A. Marks (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). In: Data Management Symposium, Huntsville, Ala., October 18, 19, 1977, Proceedings. Huntsville, Ala., University of Alabama, 1978, p. 81-90. 12 refs. Contract No. NAS7-100.

The Seasat-A spacecraft, scheduled for launch in May 1978, will produce a global ocean data set covering a one-year nominal mission. Because this is a proof-of-concept mission, data processing algorithms are expected to evolve as the data base grows. To support the evolution and evaluation of algorithms, and to experiment with various techniques for processing the data, an algorithm development facility (ADF) is being developing. The ADF will provide access to the data base and its highly modularized processing programs. The processing programs will be subject to easy and frequent modification by a remote user community of sensor managers and experiment teams, who will use this capability to evaluate the overall performance of the sensors and the algorithms using surface truth data. The ADF concepts of software standardization and interface control are expected to have general applicability for adaptive data processing systems. (Author)

A78-29846 **The role of the EROS Data Center - Present and future.** A. H. Watkins (U.S. Geological Survey, Earth Resources Observation Systems Data Center, Sioux Falls, S. Dak.). In: Mapping with remote sensing data; Proceedings of the Second Annual William T. Pecora Memorial Symposium, Sioux Falls, S. Dak., October 25-29, 1976. Falls Church, Va., American Society of Photogrammetry, 1977, p. 274-281.

The holdings of the Earth Resources Observation Systems Data Center include more than 800,000 frames of Landsat imagery, 50,000 frames of other spacecraft data, 1.5 million frames of data from NASA research aircraft, and an additional 3 million frames of aerial reconnaissance photography. These data are available in the form of color or black and white photographs and various types of computer compatible tapes. The assistance and training programs of the Data Center are described, and the conversion to all-digital processing at the launch of Landsat-C is mentioned. The availability of radiometrically and geometrically enhanced data is also discussed. J.M.B.

A78-40169 **A remote sensing system for a nationwide data-bank.** H. D. Foster, J. Bos, and W. C. Richie (H. Dell Foster Co., San Antonio, Tex.). In: Annual Symposium on Machine Processing of Remotely Sensed Data, 4th, West Lafayette, Ind., June 21-23, 1977, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 160-171.

The paper discusses a remote sensing system which has been developed for a nationwide data bank. Eight instruments, including minicomputers and optomechanical devices, are used to convert aerial photography data into a digital data file on magnetic tape. The data file comprises a series of X-Y-Z real-world coordinates divided into descriptive primary levels and line-type identification. The output consists of a graphic manuscript file and a digital data-bank file. Component specifications are noted. S.C.S.

A79-11661 **40 years of Mississippi River floodplain change assessed by aerial photography.** K. N. Olson (Idaho, Dept. of Lands, Boise, Idaho) and M. P. Meyer (Minnesota, University, St. Paul, Minn.). In: American Society of Photogrammetry, Fall Technical Meeting, Little Rock, Ark., October 18-21, 1977, Proceedings. Falls Church, Va., American Society of Photogrammetry, 1977, p. 40-53. 8 refs. Grant No. DACW37-74-C-0043.

A79-11757 # **Multidate data extraction procedures for a statewide Landsat lake quality monitoring program.** L. T. Fisher, F. L. Scarpace (Wisconsin, University, Madison, Wis.), and R. G. Thomsen (Kinetic Research, Inc., Madison, Wis.). In: American Society of Photogrammetry, Annual Meeting, 44th, Washington, D.C., February 26-March 4, 1978, Proceedings. Falls Church, Va., American Society of Photogrammetry, 1978, p. 196-213. 7 refs.

The paper discusses the project developed to operationally monitor water quality in about 3,000 inland lakes in Wisconsin developed by the University of Wisconsin at Madison and the Wisconsin Department of Natural Resources. The requirements of the data-extraction process are identified as multidate analysis, atmospheric corrections, consistent data-set size, the use of automated techniques, and the utilization of existing hardware. The programs and files developed to meet these requirements are discussed including: a master lakes file called ACCESS, a control point file, a data file linked to ACCESS, programs to generate, test and edit the files, a control point file, a navigation program called SATNAV, and a data extraction program called EXTRACT. S.C.S.

A79-16667 **The automated generation and processing of digital terrain data for engineering planning.** J. Bethel, B. C. Crawley, G. Shepphird, and M. Hussain (Teledyne Geotronics, Long Beach, Calif.). In: Digital Terrain Models Symposium, St. Louis, Mo., May 9-11, 1978, Proceedings. Falls Church, Va., American Society of Photogrammetry, 1978, p. 469-480.

The paper describes a system for the automated generation of digital terrain data on an economical production basis. The system is based on the collection of three-dimensional terrain surface data from an oriented pair of vertical photographs, the ordering of the data according to a conventional rectangular coordinate grid, and the merging of data from several models to provide more extensive areal coverage. The resulting data bases are well suited to the conventional application of automated generation of contour plots for extensive project areas and may also be processed for a variety of end products. The generation of profiles along and across the drainage in a project area has successfully been demonstrated as an innovative application of digital terrain data for engineering planning. B.J.

A79-16588 **Development of a DMATC digital terrain data base system.** A. A. Noma and N. S. Spencer (U.S. Defense Mapping Agency, Topographic Center, Washington, D.C.). In: Digital Terrain Models Symposium, St. Louis, Mo., May 9-11, 1978, Proceedings. Falls Church, Va., American Society of Photogrammetry, 1978, p. 493-505. 9 refs.

The digital terrain exploitation support system installed at the Defense Mapping Agency Topographic Center (DMATC) is described. The system provides an interface between collected digital hypsographic data and its storage in a data base. In addition, the use of existing digital elevation data to produce various digital terrain products is supported by this system. System software implements techniques used for the transformation and subsequent mosaicking of diverse arbitrarily oriented digital terrain matrix (DTM) data. I/O capabilities consist of DTM data in local, geographic, and Universal Transverse Mercator coordinate systems. The system allows transformation to and from any of these coordinate systems. B.J.

A79-22527 * # **Use of change detection in assessing development plans - A Philippine example.** J. C. Coiner (NASA, Goddard Institute for Space Studies, Columbia University, New York, N.Y.) and R. C. Bruce (University of the Philippines, Quezon City, Philippines). In: International Symposium on Remote Sensing of Environment, 12th, Manila, Philippines, April 20-26, 1978, Proceedings. Volume 1. Ann Arbor, Mich., Environmental Research Institute of Michigan, 1978, p. 547-565. 16 refs. Research supported by the Marcopper Mining Corp.; Grant No. NsG-5080.

An aircraft/Landsat change-detection study conducted 1948-1972 on Marinduque Province, Republic of the Philippines, is discussed, and a procedure using both remote sensing and information systems for collection, spatial analysis, and display of periodic data is described. Each of the 4,008 25-hectare cells representing Marinduque were observed, and changes in and between variables were measured and tested using nonparametric statistics to determine the effect of specific land cover changes. Procedures using Landsat data to obtain a more continuous updating of the data base are considered. The system permits storage and comparison of historical and current data. M.L.

A79-22834 # **Application study of remote sensing to saury fisheries in Japan.** S.-I. Saitoh, S.-K. Mishima (Hokkaido University, Hakodate, Japan), J. Iisaka (IBM Japan, Ltd., Tokyo Scientific Center, Tokyo, Japan), and O. Asaoka (Meteorological Research Institute, Tokyo, Japan). In: International Symposium on Remote Sensing of Environment, 12th, Manila, Philippines, April 20-26, 1978, Proceedings. Volume 3. Ann Arbor, Mich., Environmental Research Institute of Michigan, 1978, p. 1827-1835. 6 refs.

An attempt was made to combine remote sensing data and a data base management system for marine living resources assessment, in an effort to study the feasibility of tracing fish migration patterns. The selected study area was water off the Sankiru coast (an important fishing area) and the selected study resource was saury, Cololabis saira. This paper discusses the relationship between results of nonparametric clustering analysis for commercial fishing data and Landsat MSS data, and classification results of sea water by the LARSYS program. B.J.

A79-41129 **On the correction of geometric distortion in satellite-acquired images.** G. E. Ford, V. R. Algazi, and B. G. Ages (California, University, Davis, Calif.). In: Annual Asilomar Conference on Circuits, Systems, and Computers, 12th, Pacific Grove, Calif., November 6-8, 1978, Conference Record.
New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 341-344. 6 refs.

The problem of correcting geometric distortions in satellite imagery to make the imagery compatible with data from another data base, such as a map, is considered, based on experience with Landsat and NOAA-VHRR data. Geometric distortions in digital data arise primarily from earth curvature and rotation, scan skew, differences in the horizontal and vertical pixel scales, and variations in satellite velocity, altitude and attitude. Geometric correction for Landsat data is performed using a bivariate polynomial geometric distortion model and that for NOAA-VHRR data employs a deterministic correction based on orbital parameters, followed by a bivariate polynomial transformation, due to the large distortions in the data. The procedures are relatively easy to implement on a minicomputer, although time-consuming, and lead to geometric corrections of Landsat and NOAA images to within one pixel rms. A.L.W.

A79-48448 **Use of geoencoded aerial photography as a regional data base for water resources and environmental planning studies.** J. D. Fellows (Maryland, University, College Park, Md.) and J. C. Stewart (Maryland-National Capital Park and Planning Commission, Silver Spring, Md.). In: American Society of Photogrammetry, Annual Meeting, 45th, Washington, D.C., March 18-24, 1979, Proceedings. Volume 1. Falls Church, Va., American Society of Photogrammetry, 1979, p. 1-8. (ASP 79-101)

A79-48450 * **A methodology for dam inventory and inspection with remotely sensed data.** J. P. Berger, W. R. Philipson, and T. Liang (Cornell University, Ithaca, N.Y.). In: American Society of Photogrammetry, Annual Meeting, 45th, Washington, D.C., March 18-24, 1979, Proceedings. Volume 1. Falls Church, Va., American Society of Photogrammetry, 1979, p. 56-67. 5 refs. Research supported by the U.S. Department of the Interior; Grant No. NGL-33-010-171. (ASP 79-106)

A methodology is presented to increase the efficiency and accuracy of dam inspection by incorporating remote sensing techniques into field-based monitoring programs. The methodology focuses on New York State and places emphasis on readily available remotely sensed data - aerial photographs and Landsat data. Aerial photographs are employed in establishing a state-wide data base, referenced on county highway and U.S. Geological Survey 1:24,000 scale, topographic maps. Data base updates are conducted by county or region, using aerial photographs or Landsat as a primary source of information. Field investigations are generally limited to high-hazard or special problem dams, or to dams which cannot be assessed adequately with aerial photographs. Although emphasis is placed on available data, parameters for acquiring new aircraft data for assessing dam condition are outlined. Large scale (1:10,000) vertical, stereoscopic, color-infrared photography, flown during the spring or fall, is recommended. (Author)

A79-48484 **Proposal for a national high-altitude photography data base.** P. A. Anctil (U.S. Geological Survey, Reston, Va.) and J. A. Gockowski (U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C.). In: American Society of Photogrammetry, Annual Meeting, 45th, Washington, D.C., March 18-24, 1979, Proceedings. Volume 2. Falls Church, Va., American Society of Photogrammetry, 1979, p. 551-555. (ASP 79-197)

The paper is concerned with the development of a proposal for a national high-altitude photography data base. The proposal is limited to the conterminous United States, an area of about three million square miles. The proposal is discussed relative to coverage and schedule, aircraft, cameras and film types, cycle, season, and storage and dissemination of products. This proposal has many advantages, the most important being a cost reduction from present federal agency operating costs, with no increase in staffing, to obtain national photographic coverage. The two cameras used will provide B/W mapping photographs at 1:80,000 scale and higher resolution CIR resource photographs at 1:58,000 scale to meet many of the user agencies' requirements. By pooling funds and coordinating priorities, national high-altitude photographic coverage could be completed in 3 to 4 years. S.D.

A80-11686 # **Advances in digital image display and simulation from digital terrain data bases.** M. B. Faintich, G. B. Sigler, and D. P. Fahy (U.S. Defense Mapping Agency, Aerospace Center, St. Louis Air Force Station, Mo.). In: New technology for mapping; Proceedings of the International Symposium, Ottawa, Canada, October 2-6, 1978. Ottawa, Canada, Canadian Institute of Surveying, 1979, p. 111-126.

The digital terrain data produced at the Defense Mapping Agency Aerospace Center (DMAAC) supports a wide variety of products, including input to radar simulators, guidance systems and automated cartographic systems. To facilitate the display of the data bases for analysis, DMAAC has developed the capability for computer generation of digital image displays of the terrain data in the form of gray level elevation coding, contouring, variable sun angle shaded relief and computer generated sensor scenes, including perspective views, stereo-pairs, and synthetic radar displays. All of the examples shown in this paper were generated at DMAAC on a UNIVAC 1000 series computer and reimaged onto film format using an OPTRONICS scanning, digitizing and reimaging (SDR) system. It is shown that digital terrain data bases may be effectively displayed in various image formats. This capability has proven to be a valuable editing and analysis tool for the production and specification refinement of digital terrain data. S.D.

A80-11701 # **Concept for the automatic registration of satellite images with a digital map data base.** W. Kropatsch and F. Leberl (Graz, Technische Universität, Graz, Austria). In: New technology for mapping; Proceedings of the International Symposium, Ottawa, Canada, October 2-6, 1978.
Ottawa, Canada, Canadian Institute of Surveying, 1979, p. 411-424. 11 refs. Grant No. DA-ERO-78-G044.

The concept of a computer program system for automatic recording of digital satellite images using a digital cartographic data bank is described. This concept is developed on the basis of a survey of literature on image recording, on digital line detection, and on structural pattern recognition. The computer program system is basically modular so that additional features can be added, and it has a learning capability so that accumulated experience can improve its performance. The proposed system is described along with its various elements. The entire system is based on a digital image processing system called DIDAK which was developed for a general-purpose computer environment (Wiesel, 1977). Programming for this system is under way. S.D.

A80-11706 # **Interactive analysis methods for resource mapping.** A. K. Turner (Environment Consultants, Inc., Lakewood, Colo.). In: New technology for mapping; Proceedings of the International Symposium, Ottawa, Canada, October 2-6, 1978. Ottawa, Canada, Canadian Institute of Surveying, 1979, p. 735-754. 6 refs.

An interactive composite mapping system called GMAPS (General Map Analysis and Planning System), has been used to evaluate energy development plans, and make resource and environmental assessments. GMAPS is superior to the traditional transparent overlay methods because it is much cheaper, faster and more quantitative. Using GMAPS, variables and interactions can be easily modified to rapidly investigate an unlimited range of development alternatives. An associated mapping system GCARS, (Generalized Computer Aided Route Selection), can generate a set of alternative corridors between specified termini by applying linear programming methods to GMAPS models. The corridors are ranked for suitability according to environmental and socio-economic criteria. (Author)

A80-22483 # **National land use and settlement assessment - An areal data base model for Landsat information for Bangladesh.** M. I. Chowdhury and S. D. Shamsuddin (Jahangirnagar University, Bangladesh, India). In: International Symposium on Remote Sensing of Environment, 13th, Ann Arbor, Mich., April 23-27, 1979, Proceedings. Volume 3. Ann Arbor, Mich., Environmental Research Institute of Michigan, 1979, p. 1819-1828. 7 refs.

There is a need in Bangladesh for an integrated system of data acquisition, storage, retrieval, and analysis, where existing techniques are suitably combined with Landsat technology. In the present paper, a hierarchical land use classification is proposed to achieve such an integraed system. It is suitable for qualitative and quantitative analysis in four scales - 1:1,000,000 for Landsat imagery, 1:50,000 for topographic maps, 1:30,000 for aerial photography, and 1:3960 for cadastral survey maps. V.P.

A80-25580 **An image registration algorithm using sampled binary correlation.** E. W. Cordan, Jr. (Martin Marietta Aerospace, Orlando, Fla.) and B. W. Petz (Central Florida, University, Orlando, Fla.). In: Machine processing of remotely sensed data; Proceedings of the Fifth Annual Symposium, West Lafayette, Ind., June 27-29, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 202-212. 6 refs.

One of the problems associated with the automatic image processing of satellite photographs such as weather maps is the need for image registration; that is, the fitting of a map that has some translational and rotational bias to a known data base. This paper investigates a least squares method of image registration using an image that has been converted into a boundary map with a pixel representation of 1 for land, -1 for water and zero for cloud pixels. A sampled correlation array is constructed about the correlation peak of the binary cross-correlation for the coded satellite map against its data base by shifting the satellite map to locations on a given grid, and performing an accumulation of the pixel-by-pixel comparisons between the satellite image and its data base over the whole map or a smaller search window. A least squares approximation of the translational and rotational bias can then be performed using the data from this sampled correlation array, fitted against a shape such as an elliptical cone. (Author)

A80-25589 * # **A system for processing Landsat and other georeferenced data for resource management applications.** S. L. Whitley (NASA, National Space Technology Laboratories, Earth Resources Laboratory, Slidell, La.). In: Machine processing of remotely sensed data; Proceedings of the Fifth Annual Symposium, West Lafayette, Ind., June 27-29, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 294-303. 7 refs.

The NASA Earth Resources Laboratory has developed a transferable system for processing Landsat and disparate data with capabilities for digital data classification, georeferencing, overlaying, and data base management. This system is known as the Earth Resources Data Analysis System. The versatility of the system has been demonstrated with applications in several disciplines. A description is given of a low-cost data system concept that is suitable for transfer to one's available in-house minicomputer or to a low-cost computer purchased for this purpose. Software packages are described that process Landsat data to produce surface cover classifications and that geographically reference the data to the UTM projection. Programs are also described that incorporate several sets of Landsat derived information, topographic information, soils information, rainfall information, etc., into a data base. Selected application algorithms are discussed and sample products are presented. The types of computers on which the low-cost data system concept has been implemented are identified, typical implementation costs are given, and the source where the software may be obtained is identified. (Author)

A80-25590 **Georgia's operational Landsat processing system.** N. L. Faust, L. E. Jordan (Georgia Institute of Technology, Atlanta, Ga.), and B. Q. Rado (Georgia Department of Natural Resources, Atlanta, Ga.). In: Machine processing of remotely sensed data; Proceedings of the Fifth Annual Symposium, West Lafayette, Ind., June 27-29, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 304-310. 9 refs.

A80-43476 * **Integrated use of Landsat data for state resource management.** W. G. Schneider, Jr. (Research supported by NASA; Contract No. NASw-3140. Lexington, Ky., Council of State Governments, 1979. 41 p. 6 refs. $4.00.

The study deals with the integration of a practical information resource - data from the earth orbiting satellite Landsat - with alternate forms of data to structure a state resource data base. State use of Landsat data within a comprehensive resource management scheme is examined. The efforts of NASA in the transfer of this space technology to state resource management applications are outlined. The role two nongovernmental sectors, universities and private industry, play in assisting states to develop Landsat data analysis capability is described. V.T.

N79-13422*# **Electromagnetic Systems Labs., Sunnyvale, Calif.**
IMAGE SELECTION SYSTEM
M. A. Knutson, Donald Hurd, Larry Hubble, and Richard M. Kroeck Washington NASA Nov. 1974 58 p ref
(Contract NAS2-7084)
(NASA-CR-2475; ESL-TM-458) Avail: NTIS HC $4.75 CSCL 05B

An image selection (ISS) was developed for the NASA-Ames Research Center Earth Resources Aircraft Project. The ISS is an interactive, graphics oriented, computer retrieval system for aerial imagery. An analysis of user coverage requests and retrieval strategies is presented, followed by a complete system description. Data base structure, retrieval processors, command language, interactive display options, file structures, and the system's capability to manage sets of selected imagery are described. A detailed example of an area coverage request is graphically presented. Author

N79-17768# Rome Air Development Center, Griffiss AFB, N.Y.
AN EVOLUTIONARY APPROACH FOR IMPLEMENTING A LARGE MULTI-USER TERRAIN DATA BASE THROUGH AN

INTERACTIVE SYSTEM FOR TERRAIN PERSPECTIVE SIMULATION IN-STEPS PROGRAM
Gerald T. Caprero and Stanford T. Hovey Aug. 1974 74 p refs
(AD-A000045; RADC-TR-74-234) Avail: NTIS CSCL 08/2

The primary motivation of the study described herein was to provide digitized terrain data to be used in support of Electromagnetic Compatibility (EMC) related problems. Present day data bases are not convenient for the Rome Air Development Center's (RADC) electromagnetic prediction and modelling needs for the design and study of present and future weapon and support systems. Rather than design a system strictly for EMC needs, as has been done in the past in many areas, this technical report describes an approach for developing a multi-user digital terrain data base by using existing governmental computer aids. (Modified author abstract) GRA

N75-27842# PRC Information Sciences Co., McLean, Va.
CARTOGRAPHIC DATA BASE HIERARCHY. VOLUME 1: SYSTEMS ANALYSIS AND DESIGN Final Report, Jun. 1972 - Aug. 1973
Donald T. Alvarez and M. Lynn Taylor Sep. 1974 87 p refs
(Contract F30602-72-C-0457)
(AD-A004382; PRC-R-1690-Vol-1; RADC-TR-74-228-Vol-1) Avail: NTIS CSCL 08/2

The objective of the Cartographic Data Base Hierarchy project was to analyze, design, implement, and test an experimental data base system which employs a hierarchical encoding scheme. Highlights of the implemented system include the following. Design is based on a generalized feature classification system which allows for detailed description of cartographic features. The classification system is composed of feature classes, types, sub-types, eight special descriptors, special numeric, feature name, free text comment, and references to source materials. Implementation, for experimental purposes, is on the Honeywell 635 computer system using Integrated Data Store (IDS) for data management services, and is written in the COBOL Language. Functional capabilities include loading, retrieval, remote query, deletion, and modification. Remote query capability allows a user to interactively communicate with the CDB through a remote terminal for purposes of accessing and retrieving cartographic information. Hierarchical Data Structure which provides for four geographic segmentation levels, two levels of feature segmentation, and two levels of feature description (i.e., subjective and locational). Storage of geographic coordinate strings in a compact incremental format allowing for variable data resolutions. GRA

N75-27843# PRC Information Sciences Co., McLean, Va.
CARTOGRAPHIC DATA BASE HIERARCHY. VOLUME 2: SYSTEM IMPLEMENTATION AND TESTING Final Report, Jun. 1972 - Aug. 1973
Donald T. Alvarez, M. Lynn Taylor, and Gray W. Virkler Sep. 1974 153 p refs
(Contract F30602-72-C-0457)
(AD-A004383; PRC-R-1690-Vol-2; RADC-TR-74-228-Vol-2) Avail: NTIS CSCL 08/2

The purpose of Final Technical Report, Volume II, is to describe the data base system implemented, including: data hierarchy and record structure, data base contents, hardware system used, software modules developed, directions for system users, and summary results of system testing. GRA

N75-27844# PRC Information Sciences Co., McLean, Va.
CARTOGRAPHIC DATA BASE HIERARCHY. VOLUME 3: PROGRAM DOCUMENTATION Final Report, Jun. 1972 - Aug. 1973
Donald T. Alvarez, M. Lynn Taylor, and Gary W. Virkler Sep. 1974 123 p refs
(Contract F30602-72-C-0457)
(AD-A004384; PRC-R-1690-Vol-3; RADC-TR-74-228-Vol-3) Avail: NTIS CSCL 08/2

The purpose of Final Technical Report, Volume III, is to present the experimental CDB software operating environment and program documentation. Section II of this volume describes the operational environment of the CDB system including the software configuration, common data area formats, and file formats. Section III presents the program descriptions. GRA

N75-21881*# General Electric Co., Philadelphia, Pa. Space Div.
TERSSE: DEFINITION OF THE TOTAL EARTH RESOURCES SYSTEM FOR THE SHUTTLE ERA. VOLUME 8: USER'S MISSION AND SYSTEM REQUIREMENTS DATA (APPENDIX A OF VOLUME 3)
Oct. 1974 303 p
(Contract NAS9-13401)
(NASA-CR-141774) Avail: NTIS HC $9.25 CSCL 05B

A computer printout is presented of the mission requirement for the TERSSE missions and their associated user tasks. The data included in the data base represents a broad-based attempt to define the amount, extent, and type of information needed for an earth resources management program in the era of the space shuttle. An effort was made to consider all aspects of remote sensing and resource management; because of its broad scope, it is not intended that the data be used without verification for in-depth studies of particular missions and/or users. The data base represents the quantitative structure necessary to define the TERSSE architecture and requirements, and to an overall integrated view of the earth resources technology requirements of the 1980's. Author

N76-11524*# South Dakota State Univ., Brookings. Remote Sensing Inst.
INVESTIGATION OF REMOTE SENSING TECHNIQUES AS INPUTS TO OPERATIONAL RESOURCE MANAGEMENT MODELS Interim Report, 11 Jun. - 10 Sep. 1975
Fred A. Schmer, Principal Investigator and Robert E. Isakson Sep. 1975 16 p ref Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 ERTS
(Contract NAS5-20982)
(E76-10028; NASA-CR-145419; RSI-SDSU-75-08) Avail: NTIS HC $3.50 CSCL 08F

N76-11848*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
RESULTS OF PHASE ONE OF LAND USE INFORMATION DELPHI STUDY
Charles K. Paul and Albert J. Landini 1 May 1975 38 p
(Contract NAS7-100)
(NASA-CR-145574; JPL-SP-43-22) Avail: NTIS HC $4.00 CSCL 08B

The Land Use Management Information System (LUMIS) is being developed for the city portion of the Santa Monica mountains. LUMIS incorporates data developed from maps and aerial photos as well as traditional land based data associated with routine city and county record keeping activities and traditional census data. To achieve the merging of natural resource data with governmental data LUMIS is being designed in accordance with restrictions associated with two other land use information systems currently being constructed by Los Angeles city staff. The two city systems are LUPAMS (Land Use Planning and Management System) which is based on data recorded by the County Assessor's office for each individual parcel of land in the city, and Geo-BEDS, a geographically based environmental data system. Author

N76-12483*+ National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT: US STANDARD CATALOG NO. U-38
31 Oct. 1975 108 p
(NASA-TM-X-145712) Avail: NTIS HC $5.50; EROS Data Center, Sioux Falls, S. D., 57198 HC $1.25 CSCL 08B

Information regarding the availability of LANDSAT imagery processed and input to the data files by the NASA Data Processing Facility is published on a monthly basis. The U.S. Standard Catalog includes imagery covering the continental United States, Alaska and Hawaii. The Non-U.S. Standard Catalog identifies all the remaining coverage. Sections 1 and 2 describe the contents and format for the catalogs and the associated microfilm.

Section 3 provides a cross-reference defining the beginning and ending dates for LANDSAT cycles. Sections 4 and 5 cover LANDSAT-1 and LANDSAT-2 coverage, respectively. Author

N76-14861*# Inter-American Geodetic Survey, Fort Clayton (Canal Zone).
OVERALL EVALUATION OF SKYLAB IMAGERY FOR MAPPING OF LATIN AMERICA Final Report, Aug. 1972 - Sep. 1975
Jack E. Staples, Jorge Jose Maria Fridden (Inst. Geografico Militar, Argentina), Oscar Wilde Fernandez (Inst. Geografico Militar, Bolivia), Miguel Alves (Inst. Brasileiro de Geografiá e Estatistica, Peru), Jose Mutis (Inst. Geografico Militar, Chile), Alvaro Gonzalez Fletcher (Inst. Geografico Agustin Codazzi, Columbia), Mario Barrantes Ferrero (Inst. Geografico Nacional de Costa Rica), Jose Joaquin Hungria Morell (Inst. Geografico Univ., Republica Dominicana), Leonardo Endara Romero (Inst. Geografico Militar, Ecuador), Jose Alberto Gonzalez Garcia, Principal Investigators (Inst. Geografico Nacional, El Salvador) et al Sep. 1975 101 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 EREP
(NASA Order T-4651-B)
(E76-10078; NASA-CR-144478) Avail: NTIS HC $5.50 CSCL 08B

The author has identified the following significant results. Skylab imagery is both desired and needed by the Latin American cartographic agencies. The imagery is cost beneficial for the production of new mapping and maintenance of existing maps at national topographic series scales. If this information was available on a near time routine coverage basis, it would provide an excellent additional data base to the Latin American cartographic community, specifically Argentina, Bolivia, Chile, Colombia, Dominican Republic, Guatemala, Paraguay, and Venezuela.

N76-15866# Central Intelligence Agency, McLean, Va. Office of Joint Computer Support.
ROTATE AND SCALE (ROTSAL) PROGRAM FOR CARTOGRAPHIC APPLICATION; PROGRAM DOCUMENTATION
P. [illegible] Aug. 1975 61 p
(PB-244804/9; CIA/CP-75/1a; CIA/DI-75/001a) Avail: NTIS HC $4.50 CSCL 08B

The Rotate and Scale (ROTSAL) program is an IBM Systems 360 FORTRAN program for cartographic application which accepts as input the raw digitized x-y coordinate data, performs several automatic map editing functions, and outputs data in the Graphic Data Format. The program also allows for automatic I/O error recovery from illegal characters of incomplete records in the raw digitized map data. The Automatic Map Editing functions are: rotate the data through an angle determined by the position of the three corners of the map; scale (calibrate) the data from digitizer measurements; offset and shift the data to an origin of (0,0); eliminate duplicate points; check the distance between consecutive data points and either discard the point, or create additional points between the two values; close lines for islands and lakes; and allow for partial or complete deletion aid of a line. ROTSAL was developed as an aid for creating World Data Banks of the AUTOMAP System. GRA

N76-16608# Bausch and Lomb, Inc., Rochester, N.Y.
PAVE STRIKE ANALYSIS. 1: INVESTIGATION OF A POINT TRANSFER DEVICE Final Technical Report
Walter R. Ambrose Griffiss AFB, N.Y. RADC Jun. 1975 57 p
(Contract F30602-74-C-0286; AF Proj. 2106)
(AD-A015067; RADC-TR-75-151) Avail: NTIS CSCL 08/2

This effort investigated the requirements for a point transfer device to support the Manual Photogrammetric Targeting System (PTS-M). The purpose of the point transfer device is to correlate a tactical image with a data base image and to make a physical mark on the data base image which precisely locates a target observed on the tactical image. This report defines the factors affecting the design of the instrument, itemizes the design specifications, surveys possible off-the-shelf equipment and suggests an instrument which can meet the requirements. The indicated design will allow an operator to view a tactical image and a data base image in superposition. The operator can change the scale, stretch, direction of stretch, rotation and translation of both images until they are precisely registered. The operator aligns a reticle with the target, activates a marker and makes a mark on the data base which corresponds to the position of the target. A capacitive discharge system is used in the marking. A study was made to compare the repeatability of various viewing modes but the results were inconclusive and further experimentation was recommended. GRA

N76-17475* South Dakota State Univ., Brookings. Plant Science Dept.
LANDSAT-1 DATA, ITS USE IN A SOIL SURVEY PROGRAM
F. C. Westin and C. J. Frazee *In* NASA. Lyndon B. Johnson Space Center. NASA Earth Resources Survey Symp., Vol. 1-A: Agr., Environment Jun. 1975 p 67-95 refs

(A-6) CSCL 08M

The following applications of LANDSAT imagery were investigated: assistance in recognizing soil survey boundaries, low intensity soil surveys, and preparation of a base map for publishing thematic soils maps. The following characteristics of LANDSAT imagery were tested as they apply to the recognition of soil boundaries in South Dakota and western Minnesota: synoptic views due to the large areas covered, near-orthography and lack of distortion, flexibility of selecting the proper season, data recording in four parts of the spectrum, and the use of computer compatible tapes. A low intensity soil survey of Pennington County, South Dakota was completed in 1974. Low intensity inexpensive soil surveys can provide the data needed to evaluate agricultural land for the remaining counties until detailed soil surveys are completed. In using LANDSAT imagery as a base map for publishing thematic soil maps, the first step was to prepare a mosaic with 20 LANDSAT scenes from several late spring passes in 1973. Author

N76-17587* Washington Univ., Seattle.
DEVELOPMENT OF USER APPLICATIONS FOR EARTH RESOURCES SURVEY DATA IN URBAN AND REGIONAL PLANNING IN THE PUGET SOUND AREA
Frank V. Westerlund *In* NASA. Lyndon B. Johnson Space Center NASA Earth Resources Surv. Symp., Vol. 1-C Jun. 1975 p 1769-1784 refs
(DI-14-08-001-12864)
(L-17) CSCL 08A

User applications of remote sensing in Washington State are described. The first project created a multi-temporal land use/land cover data base for the environs of the Seattle-Tacoma International Airport, to serve planning and management operations of the Port of Seattle. The second is an on-going effort to develop a capability within the Puget Sound Governmental Conference, a council of governments (COG), to inventory and monitor land use within its four county jurisdiction. Developmental work has focused on refinement of land use/cover classification systems applicable at this regional scale and various levels of detail in relation to program requirements of the agency. Related research, refinement of manual methods, user training and approaches to technology transfer are discussed. Author

N76-18886*# Science Univ. of Tokyo (Japan).
INVESTIGATION OF ENVIRONMENTAL CHANGE PATTERN IN JAPAN: A STUDY ON CHANGE DETECTION OF LAND COVER IN TOKYO DISTRICTS USING MULTI-DATES LANDSAT CCT Quarterly Report
Takakazu Maruyasu and Shunji Murai, Principal Investigators (Tokyo Univ., Japan) 9 Jan. 1976 9 p Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 ERTS
(E76-10174; NASA-CR-146374) Avail: NTIS HC $3.50 CSCL 08F

The author has identified the following significant results. The software program, which enables the geographically corrected LANDSAT digital data base, was developed. The data base could provide land use planners with land cover information and the environmental change pattern. Land cover was evaluated by the color representation for ratio of three primary components, water vegetation, and nonorganic matter. Software was also developed for the change detection within multidates LANDSAT MSS data.

N76-19512*# Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.
EVALUATION OF SKYLAB (EREP) DATA FOR FOREST AND RANGELAND SURVEYS Final Report
Robert C. Aldrich, Principal Investigator, Robert W. Dana, Wallace J. Greentree, Edwin H. Roberts, Nancy X. Norick, Thomas H. Waite, Richard E. Francis (Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.), Richard S. Driscoll (Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.), and Frederick P. Weber 1 Dec. 1975 282 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 EREP
(NASA Order T-4106-B)
(E76-10204; NASA-CR-147440) Avail: NTIS HC $9.25 CSCL 08F

The author has identified the following significant results. Four widely separated sites (near Augusta, Georgia; Lead, South Dakota; Manitou, Colorado; and Redding, California) were selected as typical sites for forest inventory, forest stress, rangeland inventory, and atmospheric and solar measurements, respectively. Results indicated that Skylab S190B color photography is good for classification of Level 1 forest and nonforest land (90 to 95 percent correct) and could be used as a data base for sampling by small and medium scale photography using regression techniques. The accuracy of Level 2 forest and nonforest classes, however, varied from fair to poor. Results of plant community classification tests indicate that both visual and microdensitometric techniques can separate deciduous, coniferous, and grassland classes to the region level in the Ecoclass hierarchical classification system. There was no consistency in classifying tree categories at the series level by visual photointerpretation. The relationship between ground measurements and large scale photo measurements of foliar cover had a correlation coefficient of greater than 0.75. Some of the relationships, however, were site dependent.

N76-22621*# Oregon State Univ., Corvallis.
SMALL SCALE PHOTO PROBABILITY SAMPLING AND VEGETATION CLASSIFICATION IN SOUTHEAST ARIZONA AS AN ECOLOGICAL BASE FOR RESOURCE INVENTORY Ph.D. Thesis
James Russell Johnson, Principal Investigator 17 May 1974 205 p refs Sponsored by NASA. Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 ERTS
(E76-10301; NASA-CR-146794) Avail: NTIS HC $7.75 CSCL 08F

The author has identified the following significant results. The broad scale vegetation classification was developed for a 3,200 sq mile area in southeastern Arizona. The 31 vegetation types were derived from association tables which contained information taken at about 500 ground sites. The classification provided an information base that was suitable for use with small scale photography. A procedure was developed and tested for objectively comparing photo images. The procedure consisted of two parts, image groupability testing and image complexity testing. The Apollo and ERTS photos were compared for relative suitability as first stage stratification bases in two stage proportional probability sampling. High altitude photography was used in common at the second stage.

N76-23648*# Geological Survey, Reston, Va.
LAND USE ANALYSIS OF US URBAN AREAS USING HIGH-RESOLUTION IMAGERY FROM SKYLAB
Daniel B. Gallagher, Principal Investigator 10 Sep. 1975 32 p refs Presented at Skylab Earth Resources Experiment Package Regional Planning and Development Conf., Lafayette, Ind., 9-10 Sep. 1975 Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 EREP
(NASA Order T-5290-B)
(E76-10321; NASA-CR-147654) Avail: NTIS HC $4.00 CSCL 02C

The author has identified the following significant results. The S-190B imagery from Skylab 3 permitted the detection of higher levels of land use detail than any satellite imagery previously evaluated using manual interpretation techniques. Resolution approaches that of 1:100,000 scale infrared aircraft photography, especially regarding urban areas. Nonurban areas are less distinct.

N76-25641# Singer Co., Sunnyvale, Calif. Simulation Products Div.
INFRARED IMAGE PREDICTION USING THE PROJECT 1183 OFF-LINE DIGITAL DATA BASE Final Report, 19 May - 10 Oct. 1975
J. H. Jacobson and Steve Bryan Oct. 1975 103 p
(Contract F33657-73-C-0882; AF Proj. 1183)
(AD-A020117; UC-7254-02) Avail: NTIS CSCL 08/2

This report describes a field survey of the Las Vegas area to obtain infrared radiation data for features in the high resolution Defense Mapping Agency, Project 1183 off-line digital data base. The data have been analyzed and additional descriptors assigned to the digital data base to enable computer generation of infrared imagery that approximates real-world views. Computer-generated infrared imagery along with corresponding real-world imagery are included in this report to demonstrate the realism of the imagery predictions. The simulated images were generated on a real-time Digital Image Generator system. GRA

N76-25643# Control Data Corp., Minneapolis, Minn. Digital Image Systems Div.
DIGITAL ORTHOPHOTO STUDY Final Technical Report, Nov. 1974 - May 1975
D. J. Panton Dec. 1975 128 p refs
(Contract F30602-75-C-0050; AF Proj. 5569)
(AD-A020066; RADC-TR-75-218) Avail: NTIS CSCL 08/2

The purpose of this study is to investigate a number of fast and flexible alternatives in the area of automated cartography as they apply to the production and utilization of digital orthophotos. Three digital algorithms and their associated techniques were developed to generate orthophotos. The primary utilization of digital orthophotos is in data base applications. Concepts and techniques for the construction, maintenance and exploitation of such a normalized data base are discussed. A review of existing orthophoto techniques is provided for comparison and trade-off determination purpose.
Author (GRA)

N76-28881* Joint Federal-State Land Use Planning Commission for Alaska, Juneau.
ALASKA'S NEEDS IN REMOTE SENSING
John L. Hall *In* NASA. Lyndon B. Johnson Space Center NASA Earth Resources Survey Symp., Vol. 2-B Jun. 1975 p 315-318
CSCL 05B

Joint Federal/State remote data sensing centers are advocated to help survey Alaska for land use planning by aerial photography and LANDSAT imagery. The centers are to provide satellite derived information in land use planning and offshore oil developments. G.G.

N76-28889* EROS Data Center, Sioux Falls, S. Dak.
DATA AVAILABILITY AND THE ROLE OF THE EARTH RESOURCES OBSERVATION SYSTEMS DATA CENTER
Allen H. Watkins *In* NASA. Lyndon B. Johnson Space Center NASA Earth Resources Survey Symp., Vol. 2-B Jun. 1975 p 372-378
CSCL 05B

With the launch of LANDSAT-1 in July 1972, and the follow-on launch of LANDSAT-2 in January of this year, routine availability of satellite imagery and electronic data of the earth's resources has become a reality. Federal data centers provide LANDSAT data to resource managers and the general public. These data centers have to date provided almost 500,000 frames of LANDSAT data at a cost of more than $2,000,000. Data from the LANDSAT satellite program, along with data and information from the Skylab manned program, are available over any location to anyone for the cost of reproduction. Author

N76-28607*# Northern Prairie Wildlife Research Center, Jamestown, N. Dak.
APPLICATION OF LANDSAT SYSTEM FOR IMPROVING METHODOLOGY FOR INVENTORY AND CLASSIFICATION OF WETLANDS Progress Report, 1 Apr. - 30 Jun. 1976
David S. Gilmer, Principal Investigator 6 Jul. 1976 20 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S. D. 57198 ERTS
(NASA Order S-54049-A)
(E76-10421, NASA-CR-148307) Avail: NTIS HC $3.50 CSCL 08B

The author has identified the following significant results. A newly developed software system for generating statistics on surface water features was tested using LANDSAT data acquired previous to 1975. This software test provided a satisfactory evaluation of the system and also allowed expansion of data base on prairie water features. The software system recognizes water on the basis of a classification algorithm. This classification is accomplished by level thresholding a single near infrared data channel. After each pixel is classified as water or nonwater, the software system then recognizes ponds or lakes as sets of contiguous pixels or as single isolated pixels in the case of very small ponds. Pixels are considered to be contiguous if they are adjacent between successive scan lines. After delineating each water feature, the software system then assigns the feature a position based upon a geographic grid system and calculates the feature's planimetric area, its perimeter, and a parameter known as the shape factor.

N76-32624*# Caspar Corp., Houston, Tex.
[SELECTED IMAGERY FROM EARTH RESOURCES SURVEY PROGRAM] Final Report
1976 23 p
(Contract NAS9-14702)
(NASA-CR-150990) Avail: NTIS HC $3.50 CSCL 05B

Preparation of LACIE documents for data base entry and indexing of imagery from selected Earth Resources Survey Program sources is described. J.M.S.

N76-33611# Geological Survey, Denver, Colo. Conservation Div.
SELECTED GEOTHERMAL RESOURCES DATA: HYDROTHERMAL CONVECTION SYSTEMS IN THE STATES OF ALASKA, ARIZONA, CALIFORNIA, COLORADO, HAWAII, IDAHO, MONTANA, NEVADA, NEW MEXICO, OREGON, UTAH, WASHINGTON, AND WYOMING Final Data to Jun. 1975
J. L. Renner Feb. 1976 358 p refs Sponsored in part by ERDA
(PB-250377/9, USGS-CD-76-001, CRPU-76-16) Avail: NTIS HC $10.50 CSCL 08G

Data collected as part of the U.S. Geological Survey's research and land classification programs, from professional publications, and industry sources were compiled in computer format. Location, surface manifestations, chemistry, physical properties, exploratory and development work, and references pertinent to 290 hydrothermal convection systems comprise the data base. GRA

N77-10632# General Electric Co., Santa Barbara, Calif.
MONITORING GROUNDWATER QUALITY: DATA MANAGEMENT
Norman F. Hampton Apr. 1976 72 p refs
(Contract EPA-68-01-0759)
(PB-255492/1, GE75TMP-70, EPA-600/4-76-019) Avail: NTIS HC A04/MF A01 CSCL 08H

Management of a data base which assures that pertinent information is available when and where it is needed is discussed. The requirements of groundwater data management are described, and available capabilities which may serve to satisfy these requirements are examined. The means by which these capabilities can be used to accomplish the management of groundwater data are identified. GRA

N77-11523*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT: US STANDARD CATALOG Monthly Report, 1-31 Aug. 1976
31 Aug. 1976 130 p
(NASA-TM-X-74216, GSFC/LU-76/008, NTISUB/B/138-76/008) Avail: NTIS HC A07/MF A01 CSCL 05B

Information regarding the availability of LANDSAT imagery processed and input to the data files by the NASA Data Processing Facility is published on a monthly basis. The U.S. Standard Catalog includes imagery covering the continental United States, Alaska and Hawaii. The Non-U.S. standard Catalog identifies all the remaining coverage. Sections 1 and 2 describe the contents and format for the catalogs and the associated microfilm. The section 3 provides a cross-reference defining the beginning and ending dates for LANDSAT cycles. Author

N77-12472*# Ohio Dept. of Economic and Community Development, Columbus.
THE OHIO LAND ALLOCATION MODEL, PHASE 2
Oscar Fisch, Principal Investigator and Steven I. Gordon Jul. 1976 81 p refs ERTS
(Contract NAS5-22399)
(E77-10042, NASA-CR-149171) Avail: NTIS HC A05/MF A01 CSCL 08B

N77-12483*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
LUMIS: LAND USE MANAGEMENT AND INFORMATION SYSTEMS; COORDINATE ORIENTED PROGRAM DOCUMENTATION
1 Nov. 1976 161 p ref
(NASA-CR-149165, JPL-SP-43-33) Avail: NTIS HC A08/MF A01 CSCL 08B

An integrated geographic information system to assist program managers and planning groups in metropolitan regions is presented. The series of computer software programs and procedures involved in data base construction uses the census DIME file and point-in-polygon architectures. The system is described in two parts: (1) instructions to operators with regard to digitizing and editing procedures, and (2) application of data base construction algorithms to achieve map registration, assure the topological integrity of polygon files, and tabulate land use acreages within administrative districts. Author

N77-13487*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT US STANDARD CATALOG, 1-30 SEPTEMBER 1976
30 Sep. 1976 109 p
(NASA-TM-X-74302, GSFC/LU-76/009, NTISUB/B/138-76/009) Avail: NTIS HC A06/MF A01 CSCL 05B

Imagery acquired by LANDSAT 1 and LANDSAT 2 which has been processed and input to the data files during the referenced month are listed. Data, such as date acquired, cloud cover and image quality are given for each scene. The microfilm roll and frame on which the scene may be found is also given. Author

N77-13522# Computer Sciences Corp., Silver Spring, Md. System Sciences Div.
EXTENDED STUDIES OF A QUADRILATERALIZED SPHERICAL CUBE EARTH DATA BASE Final Report, Jul. 1975 - Mar. 1976
E. M. O'Neill and R. E. Laubscher 27 May 1976 114 p refs
(Contract N00228-75-C-2329)
(AD-A026294, CSC/TR-76/6008, NEPRF-TR-3-76(CSC)) Avail:

NTIS HC A06/MF A01 CSCL 08/2

This report describes the results of research into a number of aspects of a proposed global meteorological data base. Subjects covered include: improvement of formulation of map transformations; a rapid method of obtaining data base coordinates from satellite elements and scanner angles; comparison of two fast-filling algorithms; the maintenance of multiple-and variable resolution data bases; and the operation of maps in the data base coordinate system. Author (GRA)

N77-13524# Army Engineer Topographic Labs., Fort Belvoir, Va.

REMOTE SENSOR IMAGE CAPABILITIES FOR ACQUISITION OF TERRAIN INFORMATION

Theodore C. Vogel Jun. 1976 144 p refs
(DA Proj. 4A7-62707-A-855)
(AD-A026592; ETL-0054; Rept-B) Avail: NTIS HC A07/MF A01 CSCL 17/8

This report utilizes the 1,765 terrain data requirements presented in a USAETL experimental topographic data base system to determine subjectively the overall capability of remote sensor imagery to acquire terrain and environmental information. Remote sensor imagery (RSI) capabilities are evaluated by standard image-interpreter methods and are presented as five levels of capability and two levels of required mensuration. The capability codes are as follows: A - data element can be obtained from RSI; B - data element can not presently be obtained from RSI; C - partial information obtainable; D - other collection methods required; E - data element not compatible with RSI methods; 1 - measurement in X and Y direction required; 2 - measurement in X, Y, and Z direction required. The results of these evaluations indicate that 40 percent of the terrain requirements fall in code A, 5 percent in code B, 38 percent in code C, 17 percent in code D, 13 percent in mensuration category 1, and 10 percent in category 2. Author (GRA)

N77-14669*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.

EVALUATION OF ALGORITHMS FOR ESTIMATING WHEAT ACREAGE FROM MULTISPECTRAL SCANNER DATA Final Report, 15 May 1975 - 14 May 1976

Richard F. Nalepka, Principal Investigator, Wyman Richardson, and Alex P. Pentland May 1976 100 p refs EREP
(Contract NAS9-14123)
(E77-10060; NASA-CR-151000; ERIM-109600-69-F) Avail: NTIS HC A05/MF A01 CSCL 02C

The author has identified the following significant results. Fourteen different classification algorithms were tested for their ability to estimate the proportion of wheat in an area. For some algorithms, accuracy of classification in field centers was observed. The data base consisted of ground truth and LANDSAT data from 55 sections (1 x 1 mile) from five LACIE intensive test sites in Kansas and Texas. Signatures obtained from training fields selected at random from the ground truth were generally representative of the data distribution patterns. LIMMIX, an algorithm that chooses a pure signature when the data point is close enough to a signature mean and otherwise chooses the best mixture of a pair of signatures, reduced the average absolute error to 6.1% and the bias to 1.0%. QRULE run with a null test achieved a similar reduction.

N77-14687*# Earth Satellite Corp., Washington, D.C.

AOIPS WATER RESOURCES DATA MANAGEMENT SYSTEM Final Report, Dec. 1975 - Aug. 1976

Earl S. Merritt, Robert L. Shotwell, Michael C. Place, and Nathaniel J. Belknap Sep. 1976 535 p refs
(Contract NAS5-22894)
(NASA-CR-144823) Avail: NTIS HC A15/MF A01 CSCL 08H

A geocoded data management system applicable for hydrological applications was designed to demonstrate the utility of the Atmospheric and Oceanographic Information Processing System (AOIPS) for hydrological applications. Within that context, the geocoded hydrology data management system was designed to take advantage of the interactive capability of the AOIPS hardware. Portions of the Water Resource Data Management System which best demonstrate the interactive nature of the hydrology data management system were implemented on the AOIPS. A hydrological case study was prepared using all data supplied for the Bear River watershed located in northwest Utah, southeast Idaho, and western Wyoming. Author

N77-16418*# Michigan State Univ., East Lansing.

A COMPUTER SOFTWARE SYSTEM FOR INTEGRATION AND ANALYSIS OF GRID-BASED REMOTE SENSING DATA WITH OTHER NATURAL RESOURCE DATA. REMOTE SENSING PROJECT

S. E. Tilmann, W. R. Enslin, and R. Hill-Rowley 1977 13 p refs Presented at the 1977 Annual Meeting of the Am. Soc. of Photogrammetry, Washington, D.C., 28 Feb. 1977
(Grant NGL-23-004-083)
(NASA-CR-149424) Avail: NTIS HC A02/MF A01 CSCL 05B

A computer-based information system is described designed to assist in the integration of commonly available spatial data for regional planning and resource analysis. The Resource Analysis Program (RAP) provides a variety of analytical and mapping phases for single factor or multi-factor analyses. The unique analytical and graphic capabilities of RAP are demonstrated with a study conducted in Windsor Township, Eaton County, Michigan. Soil, land cover/use, topographic and geological maps were used as a data base to develope an eleven map portfolio. The major themes of the portfolio are land cover/use, non-point water pollution, waste disposal, and ground water recharge. Author

N77-18543# Oak Ridge National Lab., Tenn.

APPLICATION OF THE ORRMIS GEOGRAPHICAL DIGITIZING AND INFORMATION SYSTEM USING DATA FROM THE CARETS PROJECT

Charles R. Meyers, Jr., Donald L. Wilson, and Richard C. Durfee Apr. 1976 109 p refs Sponsored in part by NSF
(Contract W-7405-eng-26)
(ORNL-RUS-12) Avail: NTIS HC A06/MF A01

Spatial land-use and census-tract data are utilized to illustrate the Regional Environmental Systems Analysis (RESA) program's data digitization, information processing, and display techniques, for the Oak Ridge Regional Modeling Information System (ORRMIS) geographical data system. A standard display format is used that satisfies the requirements of the International Geographical Union (IGU) spatial encoding experiment. This format consists of spatial data display at the original source map scale and tabular compilation of area measurements of land use by census tract. The ORRMIS scanning-digitizing system is described, including data preparation, mechanical scanning, editing, and hierarchical cell assignment techniques, and the description is illustrated with computer-generated line printer and mechanical plotter displays. The system also has CRT plotter capability. ERA

N77-18662# Harris Corp., Melbourne, Fla. Electro-Optics Operation.

INVESTIGATION OF CARTOGRAPHIC PRESSPLATE RECORDING FROM DIGITAL DATA Final Report, Oct. 1975 - Feb. 1976

Feb. 1976 139 p refs
(Contract DAAG53-76-C-0021)
(AD-A030158; ETL-0043) Avail: NTIS HC A07/MF A01 CSCL 08/2

This study was performed to determine the feasibility of recording cartographic pressplates directly from digital data. The principal technical aspects considered were laser recording technology and pressplate recording materials. The general conclusion was that, with certain qualifications, cartographic quality pressplates can be generated directly from digital data by laser recording with present and emerging technology. The generation of some form of a full color proof directly from digital data was found to be an essential function in any future system. Although there is a high potential for near term development of a full color proofing procedure compatible with direct pressplate recording from a digital data base, this feature merits particular attention in future developmental activities. Similarly, the candidate pressplate materials, while highly promising, must be more thoroughly characterized and compared in a subsequent program phase to establish practical performance levels, quality control, and availability. Author (GRA)

N77-18554# Mead Technology Labs., Dayton, Ohio.
DIGITAL DATA TO PRESSPLATE STUDY, TECHNICAL REPORT
Stephen Kelly 21 Apr. 1976 114 p refs
(Contract DAAG53-76-C-0022)
(AD-A030159; MTR-76-1; ETL-0044) Avail: NTIS HC A06/MF A01 CSCL 08/12

A technology survey to determine the status of the technology required to expose offset plates directly from digital data is presented. Digital printing systems, utilizing lasers as an exposing device are available but not with the necessary performance to satisfy DMA's needs. Offset plates that are compatible with laser exposing devices are currently available, but not in the format sizes required by DMA. Author (GRA)

N77-19557*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
THE APPLICATION OF REMOTE SENSING TECHNOLOGY TO THE SOLUTION OF PROBLEMS IN THE MANAGEMENT OF RESOURCES IN INDIANA Semiannual Report, 1 Jun. - 30 Nov. 1976
R. A. Weismiller, Principal Investigator and R. P. Mroczynski 1977 71 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S.D. 57198 ERTS
(Grant NGL-15-005-186)
(E77-10124; NASA-CR-149867) Avail: NTIS HC A04/MF A01 CSCL 05A

The author has identified the following significant results. The Lydich quadrangle area was successfully classified into seven cover types: (1) trees, (2) poorly drained soil and water, (3) pasture land, (4) well drained brown soil, (5) moderately well drained dark brown soil, (6) moderately drained soil, and (7) medium to poorly drained soil. Measurements of the percent of mapping unit represented by a named soil series range from 44 to 55 percent. If the class identified as vegetation is combined with the named unit, the range increases from 54 to 64 percent. The Xenia mapping unit was the only unit represented by less than 50 percent of the named unit. Results from the intensive tent moth study in Owensburg and Williams were interpreted from 70 mm color infrared and visually transferred to maps. A correction factor was necessary, because the date the sample photography was taken was a month later than the intensive site data (CF x acres defoliated in each level = expanded defoliated acres).

N77-21546# PRC Information Sciences Co., McLean, Va.
PROGRAM MAINTENANCE MANUAL FOR THE REFERENCE SCENE SOFTWARE (RSS)
Carolyn B. Shelton 15 Oct. 1976 76 p
(Contract DAAK02-75-C-0098)
(AD-A033480; PRC-R-1939; ETL-0067) Avail: NTIS HC A05/MF A01 CSCL 17/9

The Reference Scene Software (RSS) is a set of eleven CDC 6400 computer programs used in-house at the U.S. Army Engineer Topographic Laboratories (USAETL), Ft. Belvoir, Virginia, to produce simulated Plan Position Indicator (PPI) radar scenes. The two inputs required by RSS are a matrix array (raster format) of digital terrain elevations and a corresponding vector digitized list of planimetry features (roads, lakes, railroads, cities, rivers, etc.). The output of RSS is raster format magnetic tape image of the circular PPI scene, which is later formatted onto 35mm film and machine compared to the actual PPI scene of the area to determine the goodness of correlation. These programs were originally developed by the Naval Training Equipment Center (NTEC), Orlando, Florida, for visual flight simulation. They were converted to run on the ETL CDC 6400 computer, new input and output routines were developed, and the radar modeling algorithm was changed to produce a better machine readable, rather than better human readable, scene. RSS is being used to determine the data base input requirements and the radar modeling algorithm parameters necessary for producing correlatable reference scenes. Author (GRA)

N77-28572# Ecology Consultants, Inc., Fort Collins, Colo.
GUIDE TO LAND COVER AND USE CLASSIFICATION SYSTEMS EMPLOYED BY WESTERN GOVERNMENTAL AGENCIES Final Report
Scott L. Ellis, Colling Fallat, Nancy Reece, and Carol Riordan Mar. 1977 190 p refs Sponsored in part by EPA, Washington, D. C.
(Contract DI-14-16-0008-2123)
(PB-265173/5; ECI-293; FWS/OBS-77/05) Avail: NTIS HC A09/MF A01 CSCL 13B

The classification systems are listed that are in use by state and Federal agencies in 18 western states and the provinces of Alberta and Manitoba in Canada. The guide--limited primarily to wildlife, land use, and terrestrial vegetation--provides summary descriptions of classification systems, and the data base and the techniques required to implement these systems. System descriptions are divided into three sections: local systems, regional and multi-regional systems, plus some Canadian systems. Each system summary includes the title of the system, contact person, objectives, background, description, products and related systems. Author and keyword indexes and a glossary of terms are included. GRA

N77-30646*# Missouri Dept. of Natural Resources, Rolla.
REMOTE SENSING APPLICATIONS TO MISSOURI ENVIRONMENTAL RESOURCES INFORMATION SYSTEM Annual Report, 15 Jan. 1976 - 15 Jan. 1977
Robert E. Myers 15 Jan. 1977 85 p
(Contract NAS8-31766)
(NASA-CR-150340) Avail: NTIS HC A05/MF A01 CSCL 08F

An efficient system for retrieval of remotely sensed data to be used by natural resources oriented agencies, and a natural resources data system that can meet the needs of state agencies were studied. To accomplish these objectives, natural resources data sources were identified, and study of systems already in operation which address themselves to the more efficient utilization of natural resources oriented data was prepared. Author

N77-30586# International Geographical Union Commission on Geographical Data Sensing and Processing.
DIGITAL GEOGRAPHIC DATA HANDLING ACTIVITIES IN THE U.S. GEOLOGICAL SURVEY Interim Report
Mar. 1976 374 p refs
(Grant DI-14-08-0001-G-215)
(PB-266663/4) Avail: NTIS HC A16/MF A01 CSCL 08F

Computer applications involving geographical data are presented. The descriptive elements include system name, contact, division, branch, objective, method, data manipulation, geographic reference, data volume, products and outputs, and state of development. Two tables summarize the system descriptions and the data volumes. GRA

N77-31887# Rhode Island Univ., Kingston. Dept. of Chemistry.
IDENTIFICATION OF OIL SLICKS BY INFRARED SPECTROSCOPY Final Report, 1 Feb. 1974 - 15 Aug. 1976
Chris W. Brown, Patricia F. Lynch, and Mark Ahmadjian Aug. 1976 301 p refs
(Grant DOT-CG-81-74-1099)
(AD-A040975; USCG-D-19-77; CGR/DC-5/77) Avail: NTIS HC A14/MF A01 CSCL 17/5

This investigation evaluated the applicability of infrared spectroscopy to identifying sources of oil spills, using computer methods for matching spectra. Eighty-five different oils of all types were 'weathered' for two weeks in at least two of four weathering grids. Two of the grids were located on Narragansett Bay (one in the Bay and one onshore), and two at the University's Kingston laboratory (one inside, and one on the roof). Spectral data on approximately 900 weathered oil samples were digitized and stored in computer data files to form a library of weathered oils. These were then compared to some 300 spectra of their unweathered sources by a computer ratio method. The investigation showed that infrared spectroscopy coupled with computer analysis is a useful technique for identifying the source of spilled oil. By using artificial weathering techniques, the correct source of a spill can be identified by infrared with a high probability when samples are collected within one week of the original spill. GRA

N78-10643# Stanford Research Inst., Menlo Park, Calif.
INTERACTIVE AIDS FOR CARTOGRAPHY AND PHOTO INTERPRETATION Semiannual Technical Report, 12 Nov. 1976 - 12 May 1977
Harry G. Barrow May 1977 37 p refs
(Contract DAAG29-76-C-0057; ARPA Order 2894; SRI Proj. 5300)
(AD-A043418) Avail: NTIS HC A03/MF A01 CSCL 08/2

This report describes the status of the SRI Image Understanding project at the end of twelve months. The central scientific goal of the research program is to investigate and develop ways in which diverse sources of knowledge may be brought to bear on the problem of interpreting images. The research is focused on the specific problems entailed in interpreting aerial photographs for cartographic or intelligence purposes. A key concept is the use of a generalized digital map to guide the process of image interpretation. Author (GRA)

N78-13623# Central Intelligence Agency, Washington, D.C. Office of Geographic and Cartographic Research.
WORLD DATA BANK 2. GENERAL USERS GUIDE
Alexander J. Gorny Jul. 1977 11 p
(PB-271869/0; CIA/DF-77/001A) Avail: NTIS HC A02/MF A01; also available in set of 5 mag tapes and PB-271869 (documentation) CP T10, PB-271874-SET CSCL 08B

World Data Bank 2 is a digital representation of the world divided into five geographic areas. Each area is contained on a single magnetic tape; each tape contains three files of unique line segments defined by individually digitized points. The five specific tapes and associated areas are Volume 1--North America; Volume 2--South America; Volume 3--Europe; Volume 4--Africa; Volume 5--Asia. The three files contained in each volume are (1) coastlines, islands, lakes (CIL); (2) rivers (RIV); (3) international boundaries (BDY). In addition, Volume 1--North America contains a fourth file of internal boundaries (PBY) to further delineate the individual states of the USA and the provinces of Canada. GRA

N78-14532*# National Oceanic and Atmospheric Administration, Washington, D. C.
POTENTIAL APPLICATIONS OF DIGITAL, VISIBLE, AND INFRARED DATA FROM GEOSTATIONARY ENVIRONMENTAL SATELLITES
D. B. Miller, M. P. Waters, III, J. D. Tarpley, R. N. Green, and D. C. Dismachek *In* ERIM Proc. of the 11th Intern. Symp. on Remote Sensing of Environment, Vol. 2 1977 p 849-858 refs
Avail: NTIS HC A99/MF A01 CSCL 05B

An hourly, digital data base from the Visible/Infrared Spin-Scan Radiometer (VISSR) instrument on the GOES-1 and SMS-2 geostationary satellites is described. Several examples of developmental applications of these quantitative digital data are presented. These include a review of recent attempts to develop products that are of use to meteorologists who provide services to aviation, agriculture, forestry, hydrology, oceanography, and climatology. The sample products include high resolution thermal gradients of land and ocean surfaces, thermal change analyses, fruit frost/freeze application, cloud-top altitude analysis, analysis of hurricane characteristics, and analyses of solar insolation. Author

N78-14560*# Environmental Research Inst. of Michigan, Ann Arbor. Information Systems and Analysis Dept.
REMOTE SENSING AND GEOGRAPHICALLY BASED INFORMATION SYSTEMS
Richard C. Cicone *In its* Proc. of the 11th Intern. Symp. on Remote Sensing of Environment, Vol. 2 1977 p 1127-1136 refs
(Contract NAS9-14988)
Avail: NTIS HC A99/MF A01 CSCL 08F

The incorporation of remotely sensed digital data in a computer based information system is seen to be equivalent to the incorporation of any other spatially oriented layer of data. The growing interest in such systems indicates a need to develop a generalized geographically oriented data base management system that could be made commercially available for a wide range of applications. Some concepts that distinguish geographic information systems were reviewed, and a simple model which can serve as a conceptual framework for the design of a generalized geographic information system was examined. Author

N78-14584*# Toledo Metropolitan Area Council of Governments, Ohio.
DEVELOPMENT OF AN INTEGRATED DATA BASE FOR LAND USE AND WATER QUALITY PLANNING
John Adams, Chris VanSchayk, and Laurence B. Istvan (ERIM) *In* ERIM Proc. of the 11th Intern. Symp. on Remote Sensing of Environment, Vol. 2 1977 p 1381-1386

Avail: NTIS HC A99/MF A01 CSCL 08B

To help understand the role played by different land resources in water quality management a computer based data system was created. The Land Resource Information System (LRIS) allows data to be readily retrieved or statistically analyzed for a variety of purposes. It is specifically formatted to perform coordination of water quality data with logy, etc. New understanding of the region gained through the use of LRIS has gone well beyond the initial purpose of assessing water quality conditions. The land use and natural features information has provided a well defined starting point for a systematic evaluation of proposed land uses, transportation, housing, and other public investments. It has laid the foundation for a comprehensive and integrated approach to many different planning and investment programs presently underway. Author

N78-14606*# Aerojet Electrosystems Co., Azusa, Calif.
DATA PROCESSING FOR THE DMSP MICROWAVE RADIOMETER SYSTEM
J. L. Rigone and A. P. Stogryn *In* ERIM Proc. of the 11th Intern. Symp. on Remote Sensing of Environment, Vol. 2 1977 p 1599-1608
Avail: NTIS HC A99/MF A01 CSCL 05B

A software program was developed and tested to process microwave radiometry data to be acquired by the microwave sensor (SSM/T) on the Defense Meteorological Satellite Program spacecraft. The SSM/T 7-channel microwave radiometer and systems data will be data-linked to Air Force Global Weather Central (AFGWC) where they will be merged with ephemeris data prior to product processing for use in the AFGWC upper air data base (UADB). The overall system utilizes an integrated design to provide atmospheric temperature soundings for global applications. The fully automated processing at AFGWC was accomplished by four related computer processor programs to produce compatible UADB soundings, evaluate system performance, and update the a priori developed inversion matrices. Tests with simulated data produced results significantly better than climatology. Author

N78-15536* ◆ National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT 1 CUMULATIVE US STANDARD CATALOG, 1976/1977
31 Jul. 1977 261 p
(NASA-TM-74993; GSFC/LN-77/013; NTISUB/C/138-013A)
Avail: NTIS HC A12 CSCL 05B

The LANDSAT 1 U.S. Cumulative Catalog lists U.S. imagery acquired by LANDSAT 1 which has been processed and input to the data files during the referenced year. Data, such as data acquired, cloud cover and image quality are given for each scene. The microfilm roll and frame on which the scene may be found are also given. Author

N78-17448*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT US STANDARD CATALOG Progress Report, 1-30 Nov. 1977
30 Nov. 1977 108 p
(NASA-TM-74998; GSFC/LU-C/011; NTISUB/C/138-011)
Avail: NTIS HC A06/MF A01 CSCL 05B

To provide dissemination of information regarding the availability of LANDSAT imagery, the Image Processing Facility (IPF), located at the Goddard Space Flight Center, publishes a U. S. and Non-U. S. Standard Catalog on a monthly schedule. These catalogs identify imagery which has been processed and input to data files during the referenced month. The U. S. Standard Catalog includes imagery covering the continental United States, Alaska, and Hawaii; the Non-U. S. Catalog identifies all the remaining coverage. Imagery adjacent to the continental U. S. and Alaskan borders will normally appear in the U. S. Standard Catalog. As a supplement to these catalogs, the LANDSAT imagery of one spectral band is available on 16mm microfilm. Author

N78-17449*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT NON-US STANDARD CATALOG Progress Report, 1-30 Nov. 1977
30 Nov. 1977 69 p
(NASA-TM-74867; GSFC/LN-C/011; NTISUB/C/139-011)
Avail: NTIS HC A04/MF A01 CSCL 05B

The Non-U.S. Standard Catalog lists Non-U.S. imagery acquired by LANDSAT 1 and 2 which has been processed and input to the data files during the referenced month. Data, such as data acquired, cloud cover and image quality are given for each scene. The microfilm roll and frame on which the scene may be found is also given. Author

N78-18801# PRC Information Sciences Co., Rome, N. Y.
CARTOGRAPHIC COMPILATION STUDY. VOLUME 1. SYSTEM REQUIREMENTS AND DESIGN ANALYSES Final Technical Report, Apr. 1974 - Jul. 1977
M. L. Taylor and R. P. OConnor Griffiss AFB, N. Y. RADC Oct. 1977 297 p 2 Vol.
(Contract F30602-72-C-0038)
(AD-A048220; RADC-TR-77-340-Vol-1) Avail: NTIS HC A13/MF A01 CSCL 08/2

The report contains an analysis of the digital cartographic compilation process with attendant hardware and software requirements. A review of available off-the-shelf hardware is included with a trade-off analysis of available hardware vs required hardware. A selection of the best hardware configuration is made and a throughput analysis is performed comparing the configured system to the current manual process. Author (GRA)

N78-18802# PRC Information Sciences Co., Rome, N. Y.
CARTOGRAPHIC COMPILATION STUDY. VOLUME 2. DESIGN SPECIFICATIONS, ADVANCED REVISION AND COMPILATION SYSTEM (ARCS) Final Technical Report, Apr. 1974 - Jul. 1977
M. L. Taylor and R. P. OConnor Griffiss AFB, N. Y. RADC Oct. 1977 289 p 2 Vol.
(Contract F30602-73-C-0038)
(AD-A048221; RADC-TR-77-340-Vol-2) Avail: NTIS HC A12/MF A01 CSCL 08/2

This report contains the hardware capability specification and complete functional flow, batch and interactive processing, for the advanced digital compilation/revision system. Author (GRA)

N78-18686*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT NON-US STANDARD CATALOG, 1-31 DECEMBER 1977
Dec. 1977 47 p
(NASA-TM-79365; GSFC/LN-C/012; NTISUB/C/139-012)
Avail: NTIS HC A03/MF A01 CSCL 05B

The non-U.S. Standard Catalog lists non-U.S. imagery acquired by Landsat 2 which has been processed and input to the data files during the referenced month. Data, such as date acquired, cloud cover and image quality are given for each scene. The microfilm roll and frame on which the scene may be found is also given. Author

N78-21530*# Maryland Univ., College Park.
MISSION OF A REMOTE SENSING CENTER
Robert M. Ragan, Dixie A. Pemberton, and Thomas D. Wilkerson *In* NASA. Goddard Space Flight Center Appl. of Remote Sensing to the Chesapeake Bay Reg. Feb. 1978 p 55-57

Avail: NTIS HC A17/MF A01 CSCL 05B

The establishment of a center for remote sensing was proposed to provide the following: (1) service, research, and education in the developing discipline of remote sensing; (2) effect multidisciplinary linkages between scientists and users of remote sensing and those who develop remote sensing techniques; and (3) strengthen and extend existing remote sensing capabilities into a cohesive program. Author

N78-27900# Los Alamos Scientific Lab., N. Mex.
MAPPING OFFSHORE OIL LEASES
J. L. Sibert 1978 8 p refs Presented at a Joint Meeting of Am. Congr. on Surveying and Mapping and Am. Soc. for Photogrammetry, Washington, D.C., 26 Feb. 1978
(Contract W-7405-eng-36)
(LA-UR-77-2892; Conf-780209-1) Avail: NTIS HC A02/MF A01

A data base query system developed as a tool for regulatory decision making is described. The legal description of each lease, based on the public and survey, is stored in the data base to provide the coordinates necessary for map production. Maps are produced interactively during a query session on a Tektronix 4014 graphics terminal. Hardcopy color maps are obtained by using a color-equipped FR-80 computer output microfilm recorder. The procedure is totally automated and is completely handled from a remote terminal. Several examples of queries and the maps they produce are presented. Other aspects of the data base retrieval system discussed include a network structure based on the CODASYL standard and a query language that allows complex retrievals to be specified in simple english phrases. ERA

N78-28882# Sandia Labs., Albuquerque, N. Mex.
IRRIGATION DATA BASE FOR ARIZONA
I. J. Hall and Sharla G. Vandevender Jan. 1978 27 p refs
(Contract EY-76-C-04-0789)
(SAND-77-0988) Avail: NTIS HC A03/MF A01

Determining the locations in the U.S. where solar energy might be used for irrigation was proposed. One of the first steps in determining these locations is to establish a data base for the agricultural states that extensively use irrigation. The data base must include information on the crops grown, the irrigation wells, and the irrigation pumps. The results of an effort to establish such a data base for the state of Arizona are presented. ERA

N78-29638*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT 2 WORLD STANDARD CATALOG, 1 JAN. - 30 APR. 1978
1978 172 p
(NASA-TM-79740; NTISUB/D/276-004) Avail: NTIS HC A08/MF A01 CSCL 05B

The World Standard Catalog lists imagery acquired by LANDSAT 2 which has been processed and input to the data files during the referenced months. Data, such as cloud cover and image quality, are given for each scene. The microfilm roll and frame on which the scene may be found is also given. Author

N78-30837*# General Electric Co., Huntsville, Ala. Space Div.
GLOBAL CROP PRODUCTION FORECASTING: AN ANALYSIS OF THE DATA SYSTEM PROBLEMS AND THEIR SOLUTIONS
J. Neiers and H. Graf May 1978 83 p refs

(Contract NAS8-32491)
(NASA-CR-150749; Rept-78HV031) Avail: NTIS HC A05/MF A01 CSCL 02C

Data related problems in the acquisition and use of satellite data necessary for operational forecasting of global crop production are considered for the purpose of establishing a measurable baseline. For data acquisition the world was divided into 37 crop regions in 22 countries. These regions represent approximately 95 percent of the total world production of the selected crops of interest, i.e., wheat, corn, soybeans, and rice. Targets were assigned to each region. Limited time periods during which data could be taken (windows) were assigned to each target. Each target was assigned to a cloud region. The DSDS was used to measure the success of obtaining data for each target during the specified windows for the regional cloud conditions and the specific alternatives being analyzed. The results of this study suggest several approaches for an operational system that will perform satisfactorily with two LANDSAT type satellites. G.G.

N78-31508*# National Aeronautics and Space Administration, Washington, D. C.
A SUMMARY OF THE USERS PERSPECTIVE OF LANDSAT-D AND REFERENCE DOCUMENT OF LANDSAT USERS
A. Donald Goedeke and Alexander J. Tuyahov, Principal Investigator 31 Jan. 1977 330 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 ERTS
(E78-10208; NASA-TM-79744) Avail: NTIS HC A15/MF A01 CSCL 05B

N78-32534*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT 2 WORLD STANDARD CATALOG, 1 MAY - 31 JULY 1978
31 Jul. 1978 322 p
(NASA-TM-79935; GSFC/LWC2-78/07; NTISUB/D/278-007) Avail: NTIS HC A14/MF A01 CSCL 05B

Information regarding the availability of LANDSAT imagery processed and input to the data files by the NASA Data Processing Facility is published on a monthly basis. The U.S. Standard Catalog includes imagery covering the continental United States, Alaska and Hawaii. The Non-U.S. Standard Catalog identifies all the remaining coverage. Sections 1 and 2 describe the contents and format for the catalogs and the associated microfilm. Section 3 provides a cross-reference defining the beginning and ending dates for LANDSAT cycles. Author

N78-32535*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT 3 WORLD STANDARD CATALOG, 6 MARCH - 31 JULY 1978
Jul. 1978 531 p
(NASA-TM-79902; GSFC/LWC3-78/07; NTISUB/D/277-007) Avail: NTIS HC A23/MF A01 CSCL 05B

The World Standard Catalog lists imagery acquired by LANDSAT 3 which was processed and input to the data files during the referenced period. Information such as date of entry, cloud cover, and image quality is given for each scene. The microfilm roll and frame on which the scene may be found is also indicated. A.R.H.

N78-33608*# General Electric Co., Philadelphia, Pa. Space Div.
PLACE: POST LANDSAT D ADVANCED CONCEPT EVALUATION Final Report
Larry Alexander, Principal Investigator 18 Aug. 1978 418 p refs ERTS
(Contract NAS2-9580)
(E78-10156; NASA-CR-156818; DOC-78SDS4238) Avail: NTIS HC A18/MF A01 CSCL 05B

N79-10803# Arizona Univ., Tucson.
WATER SUPPLY DATA BASE SYSTEM
J. F. Nunamaker, Jr. and D. E. Pingry May 1978 17 p refs
(EPRI-EA-790-SY) Avail: NTIS HC A02/MF A01

This data system has two components, a macro data base and a micro data base. The macro data base contains overview information concerning regions, organizations and data sets and their interrelationship. The micro data base contains the detailed structure of each data set, information describing each and method of accessibility. Data sets containing national and Colorado River Basin specific data are included. These data bases are currently installed on a commercial computer which is accessible through a national communication network. DOE

N79-12529*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
FOREST RESOURCE INFORMATION SYSTEM Quarterly Report, 1 Apr. - 30 Jun. 1978
R. P. Mroczynski, Principal Investigator 30 Jun. 1978 43 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 EREP
(Contract NAS9-15325)
(E79-10010; NASA-CR-151832) Avail: NTIS HC A03/MF A01 CSCL 02F

The author has identified the following significant results. Satisfactory results were obtained separately from both winter and spring LANDSAT data for areal estimates. Bitemporal results were improved by combining winter and spring data. Per-point and per-field classifiers performed comparably, except regarding time, where the per-field classifiers were more efficient.

N79-12480# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOTHERMAL EMISSIONS DATA BASE: CERRO PRIETO GEOTHERMAL FIELD
S. R. Schwartz, comp. Apr. 1978 298 p
(Contract W-7405-eng-48)
(UCID-4033) Avail: NTIS HC A13/MF A01

A new data base subset on the gaseous emissions from the Cerro Prieto geothermal field is presented. Properties and states of the reservoir fluid such as flow rates, wellhead pressure, and enthalpy are included in the file along with the well name and constituent measurement. This subset is the result of an initial screening of the data covering 1967 to 1969, and new additions will be appended periodically to the file. The data are accessed by a data base management system as are all other subsets in the file. Data output is available in the form of numerical compilations or graphical displays disposed to paper, film, or magnetic tape. DOE

N79-12481*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT 3 WORLD STANDARD CATALOG, 1-31 AUGUST 1978
Aug. 1978 270 p
(NASA-TM-79482; GSFC/LWC3-78/08; NTISUB/D/277-008) Avail: NTIS HC A12/MF A01 CSCL 05B

Imagery acquired by LANDSAT 3 which was processed and input to the data files during the referenced month is listed. Data, such as data acquired, cloud cover, and image quality are given for each scene. The microfilm roll and frame on which the scene maybe found is also given. G.G.

N79-12482*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT 2 WORLD STANDARD CATALOG, 1-31 AUGUST 1978
Aug. 1978 173 p
(NASA-TM-79481; GSFC/LWC2-78/08; NTISUB/D/278-008) Avail: NTIS HC A08/MF A01 CSCL 05B

Imagery acquired by LANDSAT 2 which was processed and input to the data files during the referenced month is listed. Data, such as data acquired, cloud cover, and image quality are given for each scene. The microfilm roll and frame on which the scene may be found is also given. G.G.

N79-14430*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

INDEPENDENT PEER EVALUATION OF THE LARGE AREA CROP INVENTORY EXPERIMENT (LACIE): THE LACIE SYMPOSIUM

Oct. 1978 41 p refs Symp. held at Houston, Tex. 23-26 Oct. 1978 Sponsored by NASA, USDA, and NOAA EREP
(E79-10009; NASA-TM-79904; JSC-14550) Avail: NTIS HC A03/MF A01 CSCL 02C

Yield models and crop estimate accuracy are discussed within the Large Area Crop Inventory Experiment. The wheat yield estimates in the United States, Canada, and U.S.S.R. are emphasized. Experimental results design, system implementation, data processing systems, and applications were considered.

N79-14435*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

FINDINGS OF THE DATA PROCESSING SYSTEMS DESIGN PEER GROUP

D. Goodenough (Canadian Center for Remote Sensing), J. Sulester (NASA. Johnson Space Center), J. Kast (Purdue Univ.), and T. Phillips, Principal Investigators (Purdue Univ.) *In its* Independent Peer Evaluation of the Large Area Crop Inventory Experiment (LACIE): The LACIE Symp. Oct. 1978 p 27-34 refs EREP

Avail: NTIS HC A03/MF A01 CSCL 02C

N79-14436*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

FINDINGS OF THE USDA APPLICATIONS TEST SYSTEM PEER GROUP

G. Nagy (Nebraska Univ., Lincoln), J. D. Murphy (USDA Foreign Agricultural Service, Houston, Tex.), D. W. Cary (CIA), H. Harkness (Sparks Commodities, Inc.), R. Head (USDA Office of Automated Data Systems, Washington, D. C.), R. Henderson (MITRE Corp.), R. LeGault (ERIM), and R. McArdle, Principal Investigators (USDA World Food and Agricultural Outlook and Situation Board, Washington, D. C.) *In its* Independent Peer Evaluation of the Large Area Crop Inventory Exneriment (LACIE): The LACIE Symp. Oct. 1978 p 35-38 EREP

Avail: NTIS HC A03/MF A01 CSCL 02C

N79-14468*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

BRIEFING MATERIALS FOR TECHNICAL PRESENTATIONS, VOLUME A: THE LACIE SYMPOSIUM

Oct. 1978 239 p Symp. held at Houston, Tex., 23-26 Oct. 1978 Sponsored by NASA, MSDA, and NOAA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 EREP
(E79-10030; NASA-TM-79930; JSC-14557-Vol-A) Avail: NTIS HC A11/MF A01 CSCL 02C

Tables, charts, and outlines of various segments within the Large Area Crop Inventory Experiment are presented. Experiment design, system implementation and operations, and data processing system design were considered.

N79-14490*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

BRIEFING MATERIALS FOR TECHNICAL PRESENTATIONS, VOLUME B: THE LACIE SYMPOSIUM

Oct. 1978 251 p Symp. held at Houston, Tex., 23-26 Oct. 1978 Sponsored by NASA, USDA, and NOAA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 EREP
(E79-10031; NASA-TM-79929; JSC-14557-Vol-B) Avail: NTIS HC A12/MF A01 CSCL 02C

Tables, charts, and LACIE segments are used to demonstrate the accuracy of estimated crop conditions and yield from 1974 to 1978, and to demonstrate the benefits of meteorological and LANDSAT data. Developments in data acquisition, sampling, and reduction are reviewed. The USDA application test system is highlighted with emphasis on user requirements, technology transfer, data base design, and cost data models for data base operation and management.

N79-14496*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

USDA APPLICATION TEST SYSTEM (ATS) SESSION: DATA BASE DESIGN FOR A WORLDWIDE MULTICROP INFORMATION SYSTEM

G. Driggers, Principal Investigator (USDA) *In its* Briefing Mater. for Tech. Presentations, Vol. B: The LACIE Symp. Oct. 1978 p 507-517 Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 EREP

Avail: NTIS HC A12/MF A01 CSCL 02C

N79-14497*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

USDA APPLICATION TEST SYSTEM (ATS) SESSION: ATS EXPERIENCE TO DATE AND FUTURE PLANS

G. May, Principal Investigator (USDA) *In its* Briefing Mater. for Tech. Presentations, Vol. B: The LACIE Symp. Oct. 1978 p 519-531 Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 EREP

Avail: NTIS HC A12/MF A01 CSCL 02C

N79-14502*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

LANDSAT 3 WORLD STANDARD CATALOG, 1-30 SEPTEMBER 1978

30 Sep. 1978 175 p
(NASA-TM-79887; GSFC/LWC/3-78/09; NTISUB/D/277-009) Avail: NTIS HC A08/MF A01 CSCL 05B

Imagery acquired by LANDSAT 3 which was processed and input to the data files during the referenced month is listed. Data, such as data acquired, cloud cover, and image quality are given for each scene. The microfilm roll and frame on which the scene may be found is also given. G.G.

N79-14503*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

LANDSAT 2 WORLD STANDARD CATALOG, 1-30 SEPTEMBER 1978

30 Sep. 1978 92 p
(NASA-TM-79886; GSFC/LWC/2-78/09; NTISUB/D/276-009) Avail: NTIS HC A05/MF A01 CSCL 05B

Imagery acquired by LANDSAT 2 which was processed and input to the data files during the referenced month is listed. Data, such as data acquired, cloud cover, and image quality are given for each scene. The microfilm roll and frame on which the scene may be found is also given. G.G.

N79-14508# L N K Corp., Inc., Silver Spring, Md.

TOWARD AUTOMATIC EXTRACTION OF CARTOGRAPHIC FEATURES Final Report

George Stockman Jul. 1978 129 p refs
(Contract DAAK70-77-C-0110)
(AD-A059942; ETL-0153) Avail: NTIS HC A07/MF A01 CSCL 08/2

The problem of automatically extracting map symbology from source imagery is studied. It is concluded that a great deal of geographic knowledge used by humans, who currently perform this extraction function, must be made available to machines before the function can be automated. Several geographic knowledge sources are discussed and an attempt is made to define paradigms under which knowledge can be encoded and used in the computer. An automatic cartographic feature extraction system (ACES) is sketched which represents a best framework for continuing development on this difficult problem given current achievements. A systems approach is taken with first consideration given to desired outputs and available inputs. It is concluded that input/output technology is far in advance of technology available for interpretation of the data. Emphasis is placed on the use of knowledge by ACES during automatic interpretation of imagery. Many types of knowledge typically used by humans appear difficult to engineer into automatic processes. Use of positional knowledge encoded in a geographic data base (GDB) is selected as the most promising avenue. Proposals are given for future research work in that direction. Author (GRA)

N79-15340*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
LARGE AREA CROP INVENTORY EXPERIMENT (LACIE). LEVEL 3 BASELINE: CLASSIFICATION AND MENSURATION SUBSYSTEM (CAMS) REQUIREMENTS, VOLUME 2, REVISION E
May 1978 121 p Revised Sponsored by NASA, NOAA, and USDA EREP
(E79-10070; NASA-TM-79933; LACIE-C00200-Vol-2-Rev-E; JSC-11330-Vol-2-Rev-E) Avail: NTIS HC A06/MF A01 CSCL 02C

N79-15352*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
LARGE AREA CROP INVENTORY EXPERIMENT (LACIE). LEVEL 3 BASELINE; SYSTEM PERFORMANCE EVALUATION, REPORT INTEGRATION (SPE-RI) REQUIREMENTS, VOLUME 6-B
18 Dec. 1974 48 p refs Sponsored by NASA, NOAA, and USDA EREP
(E79-10073; NASA-TM-79965; LACIE-00200-Vol-6-B) Avail: NTIS HC A03/MF A01 CSCL 02C

N79-15361*# California Univ., Berkeley. Space Sciences Lab.
AN INTEGRATED STUDY OF EARTH RESOURCES IN THE STATE OF CALIFORNIA USING REMOTE SENSING TECHNIQUES Annual Progress Report
Robert N. Colwell, Ralph Algazi, Leonard W. Bowden, John E. Estes, Ida R. Hoos, and Siamak Khorram, Principal Investigators 1 May 1978 220 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 ERTS
(Grant NGL-05-003-404)
(E79-10082; NASA-CR-157975; SSL-Ser-19-Issue-53-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 08F

N79-15372*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT WORLD STANDARD CATALOG, LANDSAT-3 Monthly Report, 1 - 31 Oct. 1978
Oct. 1978 187 p
(NASA-TM-79968; GSFC/LWC3-78/10; NTISUB/D/277-010) Avail: NTIS HC A08/MF A01 CSCL 05B

Imagery acquired by LANDSAT 3 which was processed and input to the data files during the referenced month is listed. Data such as data acquired, cloud cover, and image quality are given for each scene. The microfilm roll and frame on which the scene may be found is also given. G.G.

N79-15383*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT 2 WORLD STANDARD CATALOG, 1-30 NOVEMBER 1978
Nov. 1978 61 p
(NASA-TM-79899; NTISUB/D/276-011; GSFC/LWC2-78/11) Avail: NTIS HC A04/MF A01 CSCL 05B

The World Standard Catalog lists imagery acquired by LANDSAT 2 which was processed and input to the data files during the referenced period. Information such as cloud cover and image quality is given for each scene. The microfilm roll and frame on which the scene may be found is also given. Author

N79-15394# Federation of Rocky Mountain States, Inc., Denver, Colo. Information Systems Technical Lab.
COMPARISON OF SELECTED OPERATIONAL CAPABILITIES OF FIFTY-FOUR GEOGRAPHIC INFORMATION SYSTEMS
Larry Salmen, James Gropper, John Hamill, and Carl Reed Sep. 1977 30 p refs
(Contract DI-14-16-0008-2155)
(PB-286977/4; FWS/OBS-77/54; LC-77-90894) Avail: NTIS HC A03/MF A01 CSCL 08G

The initial evaluation results are presented for off the shelf computer software that may possibly contribute to a system which processes and outputs spatially related data for the U.S. Fish and Wildlife Service. Two sets of criteria were considered: operational criteria referring to the general hardware and software characteristics of a particular program, and functional criteria referring to the actual logical function on tasks performed by specific software. GRA

N79-16320*# Auburn Univ., Ala. Dept. of Industrial Engineering and Mechanical Engineering.
IMPLEMENTATION OF ALABAMA RESOURCES INFORMATION SYSTEM, ARIS Final Report, 20 Dec. 1976 - 15 Dec. 1978
B. E. Herring 10 Dec. 1978 56 p
(Contract NAS8-32215)
(NASA-CR-150904; ALA-AU-X996-1004-2; ALA-ARC-TENN-TOM-77-99) Avail: NTIS HC A04/MF A01 CSCL 08F

Development of ARIS - Alabama Resources Information System is summarized. Development of data bases, system simplification for user access, and making information available to personnel having a need to use ARIS or in the process of developing ARIS type systems are discussed. J.M.S.

N79-16381*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
LARGE AREA CROP INVENTORY EXPERIMENT (LACIE). LEVEL 3 BASELINE, CROP ASSESSMENT SUBSYSTEM (CAS) REQUIREMENTS, VOLUME 4, REVISION C
Oct. 1977 145 p refs Revised Sponsored by NASA, NOAA, and USDA EREP
(E79-10112; NASA-TM-79976; LACIE-C00200-Vol-4-Rev-C; JSC-11329-Vol-4-Rev-C) Avail: NTIS HC A07/MF A01 CSCL 02C

N79-16382*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
LARGE AREA CROP INVENTORY EXPERIMENT (LACIE). LEVEL 3 BASELINE; IMAGE-100 HYBRID SYSTEM PROCEDURE 1 REQUIREMENTS
Jan. 1977 22 p refs Revised Sponsored by NASA, NOAA, and USDA EREP
(E79-10126; NASA-TM-79990; LACIE-C00202; JSC-11669) Avail: NTIS HC A02/MF A01 CSCL 02C

N79-16389*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
LARGE AREA CROP INVENTORY EXPERIMENT (LACIE). LACIE PHASE 1 AND PHASE 2 ACCURACY ASSESSMENT Final Report
NASA Apr. 1978 186 p Sponsored by NASA, NOAA, and USDA EREP
(Contract NAS9-15200)
(E79-10134; NASA-CR-158143; LACIE-00450; JSC-13736) Avail: NTIS HC A09/MF A01 CSCL 02C

The author has identified the following significant results. The initial CAS estimates, which were made for each month from April through August, were considerably higher than the USDA/SRS estimates. This was attributed to: (1) the practice of considering bare ground as potential wheat and counting it as wheat; (2) overestimation of the wheat proportions in segments having only a small amount of wheat; and (3) the classification of confusion crops as wheat. At the end of the season most of the segments were reworked using improved methods based on experience gained during the season. In particular, new procedures were developed to solve the three problems listed above. These and other improvements used in the rework experiment resulted in at-harvest estimates that were much closer to the USDA/SRS estimates than those obtained during the regular season.

N79-19420 Idaho Univ., Moscow.
ANALYSIS AND SPATIAL CLASSIFICATION OF MULTIVARIATE GEOLOGIC AND REMOTELY SENSED DATA USING EMPIRICAL DISCRIMINANT ANALYSIS Ph.D. Thesis
Kenneth Tillotson Mashan 1978 593 p
Avail: Univ. Microfilms Order No. 7904862

Statistical preprocessing narrowed the data base to a hybrid subset which then is used in further analysis to produce a geological component map. This map differed from the more conventional geologic map in that all spatial categories were a function of numerical information derived from various sources, including: (1) soil and stream sediment geochemistry, (2) aeromagnetic data, (3) Bouguer gravity values, (4) LANDSAT digital spectral data, (5) digitized linear parameters, and (6) documented mine/prospect qualitative data. The methods were designed to improve spatial classifications which previously relied on remotely sensed imagery alone. Extending the spectral signature to a physical signature by providing additional data types for the classifier was believed to be a step toward this goal. R-mode principal components factor analysis was applied to all variates for data reduction and provided insight into variable correlations. Dissert. Abstr.

N79-19422*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
LARGE AREA CROP INVENTORY EXPERIMENT (LACIE). LEVEL 3 BASELINE: INFORMATION STORAGE, RETRIEVAL, AND REFORMATTING SUBSYSTEM (ISRRS) REQUIREMENTS, VOLUME 5, REVISION A
Nov. 1975 65 p Revised Sponsored by NASA, NOAA, and USDA EREP
(E79-10113; NASA-TM-79977; LACIE-C00200-Vol-5-Rev-A; JSC-0967-Vol-5-Rev-A) Avail: NTIS HC A04/MF A01 CSCL 02C

N79-19431*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT 3 WORLD STANDARD CATALOG Monthly Report, 1-31 Jan. 1979
31 Jan. 1979 171 p
(GSFC/LWC/3-79/01; NTISUB/E/277-001) Avail: NTIS HC A08/MF A01 CSCL 05B

The World Standard Catalog lists imagery acquired by LANDSAT 3 which was processed and input to the data files during the referenced period. Information such as cloud cover and image quality is given for each scene. The microfilm roll and frame on which the scene may be found is also given. Author

N79-20443*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
ACCURACY ASSESSMENT DISK DATA BASE DEVELOPMENT FOR LACIE. PHASE 3: USER'S INFORMATION
J. G. Carnes, Principal Investigator and J. E. Hartman Dec. 1978 27 p ref Sponsored by NASA, NOAA, and USDA EREP
(Contract NAS9-15200)
(E79-10172; NASA-CR-160109; JSC-14628; LEC-13003) Avail: NTIS HC A03/MF A01 CSCL 02C

N79-20446*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
FOREST RESOURCE INFORMATION SYSTEM Quarterly Report, 1 Jul. - 30 Sep. 1978
R. P. Mroczynski, Principal Investigator 30 Sep. 1978 53 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 EREP
(Contract NAS9-15325)
(E79-10175; NASA-CR-160118; LARS-093078) Avail: NTIS HC A04/MF A01 CSCL 02F

The author has identified the following significant results. A benchmark classification evaluation framework was implemented. The FRIS preprocessing activities were refined. Potential geo-based referencing systems were identified as components of FRIS.

N79-20455*# National Aeronautics and Space Administration. Earth Resources Lab., Slidell, La.
THE NATURAL RESOURCES INVENTORY SYSTEM ASVT PROJECT Final Report
Armond T. Joyce Jan. 1979 129 p refs
(NASA-TM-58211) Avail: NTIS HC A07/MF A01 CSCL 08F

The hardware/software and the associated procedures for a natural resource inventory and information system based on the use of LANDSAT-acquired multispectral scanner digital data is described. The system is designed to derive land cover/vegetation information from LANDSAT data and geographically reference this information for the production of various types of maps and for the compilation of acreage by land cover/vegetation category. The system also provides for data base building so that the LANDSAT-derived information can be related to information digitized from other sources (e.g., soils maps) in a geographic context in order to address specific applications. These applications include agricultural crop production estimation, erosion hazard-reforestation need assessment, whitetail deer habitat assessment, and site selection. The system is tested in demonstration areas located in the state of Mississippi, and the results of these application demonstrations are presented. A cost-efficiency comparison of producing land cover/vegetation maps and statistics with this system versus the use of small-scale aerial photography is made. Author

N79-21521*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
[REMOTE SENSING RESEARCH STUDIES] Final Technical Summary Report, 1 Dec. 1977 - 30 Nov. 1978
D. A. Landgrebe, Principal Investigator Nov. 1978 93 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 EREP 5 Vol.
(Contract NAS9-15466)
(E79-10166; NASA-CR-160114; LARS-113078) Avail: NTIS HC A05/MF A01 CSCL 05B

N79-24415*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
RESEARCH IN REMOTE SENSING OF AGRICULTURE, EARTH RESOURCES, AND MAN'S ENVIRONMENT Quarterly Report, 1 Dec. 1978 - 28 Feb. 1979
D. A. Landgrebe 28 Feb. 1979 65 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 EREP
(Contract NAS9-15466)
(E79-10195; NASA-CR-160143; LARS-CR-022879) Avail: NTIS HC A04/MF A01 CSCL 05B

N79-24424# Oregon State Univ., Corvallis.
GEOGRAPHICAL INFORMATION SYSTEMS: A REVIEW Environmental Impact Assessment Project
Kris Brooks May 1978 80 p refs Sponsored in part by Agriculture Dept.
(PB-290748/3; SR-517) Avail: NTIS HC A04/MF A01 CSCL 08F

A geographic information system is a computerized system designed to store, process, and analyze spatial data. Four sections comprise the report: (1) a description of the characteristics of geographic information systems; (2) profiles of geographic information systems; (3) annotated bibliography of geographic system surveys; and (4) a glossary. GRA

N79-25486*# National Aeronautics and Space Administration Earth Resources Lab., Slidell, La

A PROCEDURE FOR EXTRACTION OF DISPARATE DATA FROM MAPS INTO COMPUTERIZED DATA BASES

Bobby G. Junkin, Principal Investigator Apr 1978 53 p refs Original contains color illustrations ERTS
(E79-10210; NASA-TM-80414; Rept-167) Avail NTIS HC A04/MF A01 CSCL 05B

N79-25487# Purdue Univ., Lafayette, Ind School of Civil Engineering

GREEN RIVER DATA BASE SYSTEM

S. Stevens, A. R. Rao, G. H. Toebes, and A. Chossakos Oct 1978 164 p Sponsored by the Interior Dept
(PB-290845/7; CE-HSE-78-2; W79-04009) Avail NTIS HC A08/MF A01 CSCL 13B

A formal data bases management system was developed for use in reservoir operations model development. Time series of reservoir elevations and discharges of temperature and precipitation, and of stream stages and discharges for the Green River Basin, Ky. were collected and stored. Efficient programs for data addition, data editing, data retrieval, and data base commenting were developed. A User's Manual and a Programmer's Manual are included. In addition to its utility in model construction, the data base may be useful when satellite and/or radar data increase the input data management problem in real-time reservoir system operation using a comprehensive simulation model. GRA

N79-28638*# Purdue Univ., Lafayette, Ind Lab. for Applications of Remote Sensing

RESEARCH IN REMOTE SENSING OF AGRICULTURE, EARTH RESOURCES, AND MAN'S ENVIRONMENT Quarterly Report, 1 Mar. - 31 May 1979

D. A. Landgrebe, Principal Investigator 31 May 1979 110 p refs EREP
(Contract NAS9-15466)
(E79-10224; NASA-CR-160241; LARS-CR-053179) Avail NTIS HC A06/MF A01 CSCL 02C

N79-31710*# Lockheed Electronics Co., Houston, Tex Systems and Services Div

LARGE AREA CROP INVENTORY EXPERIMENT (LACIE). COMPOSITION AND ASSEMBLY OF A SPECTRAL-MET DATA BASE FOR SPRING AND WINTER WHEAT, VOLUME 1

M. H. Trenchard, Principal Investigator, M. L. Sestak, M. C. Kinsler, and D. E. Phinney May 1979 26 p Sponsored by NASA, NOAA, and USDA EREP
(Contract NAS9-15800)
(E79-10250; NASA-CR-160283; JSC-14901-Vol-1; LEC-13383-Vol-1) Avail NTIS HC A03/MF A01 CSCL 02C

N79-33622*# Arizona Univ., Tucson Office of Arid Lands Studies

APPLIED REMOTE SENSING PROGRAM (ARSP) Annual Report, 1978 - 1979

Jack D. Johnson, Kenneth E. Foster, David A. Mouat, Principal investigators, Robert Schowengerdt, Kim Mortensen, Charles Sauerwein, Dean Treadwell, and Arye Topor Aug 1979 89 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 ERTS
(Grant NGL-03-002-313)
(E79-10289; NASA-CR-162281) Avail NTIS HC A05/MF A01 CSCL 05B

N80-10662# Rochester Univ., N. Y. Dept. of Computer Science

STRIP TREES: A HIERARCHICAL REPRESENTATION FOR MAP FEATURES

Dana H. Ballard Dec. 1978 40 p refs
(Contract N00014-78-C-0164)
(AD-A071124; TR-32) Avail NTIS HC A03/MF A01 CSCL 08/2

There is increasing interest in map features such as points, lines and regions both as a pictorial data base for resource management and as an aid to identifying objects in aerial images. Owing to the very large amount of data involved, and the need to perform operations on this data efficiently, the representation of such features is a crucial issue. We describe a hierarchical representation of map features that consists of binary trees with a special datum at each node. This datum is called a strip and the tree that contains such data is called a strip tree. Lower levels in the tree corresponds to finer resolution representations of the map feature. The strip tree structure is a direct consequence of using the method for digitizing lines (given by Duda Hart, 1973; Turner, 1974; Douglas Peucker, 1973) and retaining all intermediate steps. This representation has several desirable properties. For features which are well-behaved, calculations such as point-membership and intersection can be resolved in O(log n) where n is the number of feature points. The map features can be efficiently encoded and displayed at various resolutions. GRA

N80-10686# Oak Ridge National Lab., Tenn.

COMPUTER MAPPING SOFTWARE AND GEOGRAPHIC DATA BASE DEVELOPMENT: OAK RIDGE NATIONAL LABORATORY USER EXPERIENCE

Bob Honea and P. Johnson 28 Jul. 1978 35 p refs Presented at Conf. on Computer Mapping Software and Data Bases, Cambridge, Mass., 26 Jul. 1978
(Contract W-7405-ENG-26)
(Conf-780727-1) Avail NTIS HC A03/MF A01

Computer graphic techniques developed for the sake of the computer graphics community tend to be esoteric and rarely suitable for user problems. Two types of users exist for computer graphic tools: the researcher who is generally satisfied with abstract but accurate displays for analysis purposes and the decision maker who requires synoptic and easily comprehended displays relevant to the issues he or she must address. Computer mapping software and data bases should be developed for the user in a generalized and standardized format for ease in transferring and to facilitate the linking or merging with larger analysis systems. Maximum utility of computer mapping tools is accomplished when linked to geographic information and analysis systems. Computer graphic techniques have varying degrees of utility depending upon whether they are used for data validation, analysis procedures or presenting research results. DOE

N80-12484 Regionale Planungsgemeinschaft Untermain, Frankfurt (West Germany).

FUTURE REMOTE SENSING TASKS IN REGIONAL PLANNING [ZUKUENFTIGE AUFGABEN DER FERNERKUNDUNG IN DER REGIONALPLANUNG]

A. vonHesler *In* Tech. Hochschule On Meas. from Aircraft Jun. 1978 p 183-186 In GERMAN
Avail Issuing Activity

Remote sensing techniques when used at the beginning of a whole variety of projects can provide notable advantages. Country, regional and town planning activities have, up until now, because of increasing population characteristics, employed quantitative planning procedures. The need for qualitative planning is becoming increasingly apparent. Financial and administrative problems are ever present. The maximum efficiency in the use of the information so acquired is essential. Suggestions put forward include promoting the availability of DIBIAS systems among experimental workers, making aircraft flights more easily available and encouraging exchanges of information. Author (ESA)

N80-13003# SRI International Corp., Menlo Park, Calif.

INTERACTIVE AIDS FOR CARTOGRAPHY AND PHOTO INTERPRETATION Semiannual Technical Report, 12 Oct. 1978 - 11 May 1979

Martin A. Fischler, G. J. Agin, H. G. Barrow, R. C. Bolles, L. H. Quam, J. M. Tenenbaum, and H. C. Wolf May 1979 31 p refs
(Contract DAAG29-76-C-0057; ARPA Order 2894)
(AD-A073452) Avail NTIS HC A02/MF A01 CSCL 08/2

The central scientific goal of the ARPA Image-Understanding Project research program at SRI International is to investigate and develop ways in which diverse sources of knowledge may be brought to bear on the problem of interpreting images. The research is concerned with specific problems that arise in processing aerial photographs for such military applications as cartography, intelligence, weapon guidance, and targeting. A key concept is the use of a generalized digital map to guide the process of image analysis. In the present phase of our program, the primary focus is on developing a 'road expert,' whose purpose is to monitor and interpret road events in aerial imagery. The objectives, methodology, and current status of our research are described in this report. Particular technical topics include data base construction and shadow and anomaly analysis. GRA

N80-14421# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
AN INTERACTIVE EDITOR FOR CARTOGRAPHIC DATA [EIN INTERAKTIVER EDITOR FUER KARTOGRAPHISCHE DATEN]
W. Kleinoeder *In its* Inform. on Cartography and Geodesy, Ser. 1: Original Rept. No. 75 1978 p 63-76 refs In GERMAN; ENGLISH summary

Avail: NTIS HC A10/MF A01
The concept and implementation of an editor for cartographic data are described. The EPIK program for interactive cartography is reviewed, and the main functions of the editor program are discussed. The implementation as part of an information system requires that the data bank system permit access to particular objects as well as access to particular regions. Author (ESA)

N80-14424# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
ESTABLISHMENT OF A DATA BASE OF THE ADMINISTRATIVE BOUNDARIES OF GERMANY, SCALE 1:500,000 TO 1:1,000,000 [AUFBAU EINER DATENBANK FUER VERWALTUNGSGRENZENKARTEN IM MASSTAB 1:500,000 BIS 1:1,000,000]
Helmut Uhrig *In its* Inform. on Cartography and Geodesy, Ser. 1: Original Rept. No. 75 1978 p 93-105 refs In GERMAN; ENGLISH summary

Avail: NTIS HC A10/MF A01
The establishment of a data base of the administrative boundaries of the Federal Republic of Germany is described. First, the data are captured on punch tapes, then read into a data base on magnetic disks and processed interactively. Errors are eliminated, data updated and, furthermore, the statistical code numbers of the rural districts have been added as a supplementary description. Author (ESA)

N80-14426# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
THREE TYPES OF GEOGRAPHIC DATA STRUCTURE: SIMILITUDES, DIFFERENCES, AND POSSIBLE SYNTHESIS [DREI TYPEN GEOGRAPHISCHER DATENSTRUKTUREN: GEMEINSAMKEITEN, UNTERSCHIEDE UND EINE MOEGLICHE SYNTHESE]
Wigand Weber *In its* Inform. on Cartography and Geodesy, Ser. 1: Original Rept. No. 75 1978 p 133-157 refs In GERMAN; ENGLISH summary Presented at Adv. Study Symp. on Topological Data Struct. for Geograph. Inform. Systems, Dedham, Mass., Oct. 1977

Avail: NTIS HC A10/MF A01
Map data structures and their direct descendants are described along with the relations among them and with general principles of data base theory using CODASYL and Relational Model concepts as a base. The three types of data structures are: the polygonal data structure, which is based on two binary relations between the polygons and the nodes of a planar boundary graph; the intersection graph data structure, describing intersections of features explicitly; and the gridded data structure, which contains relevant relations mostly in an implicit manner. Finally, attention is drawn to a fourth data structure, which essentially consists of a hierarchy of nested squares of different sizes superimposed on the map. This hierarchy is described by a binary tree, the branches of which contain the pool addresses of the linearly represented map features passing through the respective squares. Author (ESA)

N80-14427# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
GEOGRAPHIC INFORMATION SYSTEMS: A REVIEW, WITH DISCUSSION OF FUTURE DEVELOPMENTS [GEOGRAPHISCHE INFORMATIONSSYSTEME - EIN UEBERBLICK UND GEDANKEN ZUR WEITEREN ENTWICKLUNG]
Wigand Weber *In its* Inform. on Cartography and Geodesy, Ser. 1: Original Rept. No. 75 1978 p 159-186 refs In GERMAN; ENGLISH summary

Avail: NTIS HC A10/MF A01
A geographic information system (GIS) comprises locally related data in digital form. The user can interrogate such data selectively or results derived from them. The characteristics of a GIS are described, including its contents, its data structure, its possible evaluations, the algorithms used for that purpose, and the data processing installations, on which it runs (hardware). These characteristics are examined with regard to the conceptual fundamentals, where, as far as possible, alternatives are critically compared with the aim of drawing conclusions for the future development. The problems of standardization, data capture, economy, and exchange of experience in this field are also discussed. Author (ESA)

N80-15448*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
PROCEEDINGS OF TECHNICAL SESSIONS, VOLUMES 1 AND 2: THE LACIE SYMPOSIUM
Jul. 1979 1095 p refs Symp. held at Houston, Tex., 23-26 Oct. 1978 Sponsored by NASA, NOAA, and USDA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 ERTS
(E80-10030; NASA-TM-80811; JSC-16015-Vol-1;
JSC-16015-Vol-2) Avail: NTIS HC A99/MF A01 CSCL 02C
The technical design of the Large Area Crop Inventory Experiment is examined and data acquired over 3 global crop years is analyzed with respect to (1) sampling and aggregation, (2) growth size estimation, (3) classification and mensuration, (4) yield estimation, and (5) accuracy assessment. Seventy-nine papers delivered at conference sessions cover system implementation and operation, data processing systems, experiment results and accuracy, supporting research and technology, and the USDA application test system.

N80-15469*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE CROP ASSESSMENT SUBSYSTEM: SYSTEM IMPLEMENTATION AND APPROACHES USED FOR THE GENERATION OF CROP PRODUCTION REPORTS
W. E. McAllum, R. E. Hatch (Department of Agriculture, Houston, Tex.), S. M. Boatwright (Ford Aerospace and Communications Corp., Houston, Tex.), C. J. Liszcz (Lockheed Electronics Co., Houston, Tex.), and S. M. Evans, Principal Investigators (Department of Agriculture, Houston, Tex.) *In its* Proc. of Tech. Sessions, Vol. 1 and 2 Jul. 1979 p 227-241 refs ERTS

Avail: NTIS HC A99/MF A01 CSCL 02C
The primary responsibility of the crop assessment subsystem (CAS) during the three phases of LACIE was to produce crop reports that included estimates of wheat area, yield, and production, as well as a specified set of associated statistical descriptors. The operations of CAS are described with emphasis on sampling strategy, input/output data, evolution of aggregation/reporting system capabilities, and CAS aggregation procedures. A.R.H.

N80-15470*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
LACIE STATUS AND TRACKING

V. M. Dauphin, C. H. Jeffress (Lockheed Electronics Co., Houston, Tex.), and J. M. Everette, Principal Investigators *In its* Proc. of Tech. Sessions, Vol. 1 and 2 Jul. 1979 p 243-248 ERTS

Avail: NTIS HC A99/MF A01 CSCL 02C

The operational requirements and development of a system designed to meet LACIE needs for data to be available at given stations simultaneously, to measure throughput rates, and perform efficiency analyses are described. The final automated status and tracking system (ASATS) is defined and problems encountered during its evolutionary process are discussed. A.R.H.

N80-18478*# IBM Federal Systems Div., Houston, Texas.
THE LACIE DATA BASES: DESIGN CONSIDERATIONS
L. E. Westberry, Principal Investigator *In* NASA. Johnson Space Center Proc. of Tech. Sessions, Vol. 1 and 2 Jul. 1979 p 297-308 refs ERTS

Avail: NTIS HC A99/MF A01 CSCL 02C

The implementation of direct access storage devices for LACIE is discussed with emphasis on the storage and retrieval of image data. Topics covered include the definition of the problem, the solution methodology (design decisions), the initial operational structure, and the modifications which were incorporated. Some conclusions and projections of future problems to be solved are also presented. A.R.H.

N80-18480*# Department of Agriculture, Houston, Tex.
LACIE AREA, YIELD, AND PRODUCTION ESTIMATE CHARACTERISTICS: U.S.S.R.
J. R. Hickman, Principal Investigator *In* NASA. Johnson Space Center Proc. of Tech. Sessions, Vol. 1 and 2 Jul. 1979 p 481-512 ref ERTS

Avail: NTIS HC A99/MF A01 CSCL 02C

No estimates were generated for the U.S.S.R. during LACIE phase 1. Phase 2 effort was limited to two indicator regions: winter wheat areas where 385 segments were allocated, and spring wheat areas with 362 allocated segments. The level of activity for phase 3 was extended to the entire country which automatically increased the segment workload from 747 to 1947 segments. Production, area, and yield estimates, and their accuracy are discussed for phases 2 and 3 with emphasis on scope, sampling strategy, data base, LANDSAT data, yield analysis for winter and spring wheat, area and production analysis for winter and spring wheat, and technical issues and problems.
A.R.H.

N80-18488*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
LACIE AREA, YIELD, AND PRODUCTION ESTIMATE CHARACTERISTICS: CANADA
Delanne Conte (USDA Foreign Agricultural Service, Houston, Tex.), A. G. Houston, and L. O. Lowfeld, Principal Investigators (USDA Economics, Statistics, and Cooperatives Service, Houston, Tex.) *In its* Proc. of Tech. Sessions, Vol. 1 and 2 Jul. 1979 p 513-528 ERTS
Avail: NTIS HC A99/MF A01 CSCL 02C

Sampling segment allocation for Canada placed 283 segments within three provinces: Saskatchewan (170), Alberta (75), and Manitoba (38). The data base was comprised of five data sets: allocation, historical, ratio, LANDSAT, and yield. In-season area, yield, and production estimates were generated only during phase 2. These data are presented and analyzed. A.R.H.

N80-18522*# Department of Agriculture, Houston, Tex.
DATA BASE DESIGN FOR A WORLDWIDE MULTICROP INFORMATION SYSTEM
W. G. Driggers, J. M. Downs, J. R. Hickman, and R. L. Packard, Principal Investigators *In* NASA. Johnson Space Center Proc. of Tech. Sessions, Vol. 1 and 2 Jul. 1979 p 1085-1096 refs ERTS
Avail: NTIS HC A99/MF A01 CSCL 02C

A description of the USDA Application Test System data base design approach and resources is presented. The data is described in detail by category, with emphasis on those characteristics which influenced the design most. It was concluded that the use of a generalized data base in support of crop assessment is a sound concept. The IDMS11 minicomputer base system is recommended for this purpose. M.M.M.

N80-18429# Geological Survey, Reston, Va.
U.S. GEOLOGICAL SURVEY SOURCES OF PHOTOGRAPHS AND IMAGES OF BIOSPHERE RESERVES TAKEN FROM SPACECRAFT AND AIRCRAFT: YELLOWSTONE NATIONAL PARK
Janet Bonner 1979 117 p refs
(PB-301333/1) Avail: NTIS HC A06/MF A01 CSCL 08B

Computer listings of material available in photographic form showing scenes filmed by Skylab, LANDSAT, NASA aircraft, or on USGS mapping missions are presented. In the case of LANDSAT imagery, computer-compatible magnetic tapes are also available. A.R.H.

N80-18430# Geological Survey, Reston, Va.
U.S. GEOLOGICAL SURVEY SOURCES OF PHOTOGRAPHS AND IMAGES OF BIOSPHERE RESERVES TAKEN FROM SPACECRAFT AND AIRCRAFT: ROCKY MOUNTAIN NATIONAL PARK
Janet Bonner, comp. 1979 74 p
(PB-301334/9) Avail: NTIS HC A04/MF A01 CSCL 08B

Photographs and images of biosphere reserves taken from spacecraft and aircraft provide a significant data base showing broad views and details of the landscape and are invaluable in searching for changes and trends in forest cover, water area, and other diagnostic landscape features. Each data report in this series lists remotely sensed data gathered from spacecraft and aircraft available for a single biosphere reserve. Computer listings of data are provided by the EROS Data Center of the U.S. Geological Survey, which contains in its archives all of the listed material in photographic form and, in the case of LANDSAT images, can make available computer-compatible magnetic tapes of any LANDSAT scene. GRA

N80-18525*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
LARGE AREA CROP INVENTORY EXPERIMENT (LACIE). COMPOSITION AND ASSEMBLY OF A SPECTRAL-MET DATA BASE FOR SPRING AND WINTER WHEAT, VOLUME 2
M. H. Trenchard, M. L. Sestak, M. C. Kinsler, and D. E. Phinney, Principal Investigators Jun. 1979 194 p Sponsored by NASA, NOAA, and USDA ERTS
(Contract NAS9-15800)
(E80-10078; NASA-CR-160437; JSC-14901-Vol-2; LEC-13383-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 02C

N80-18538# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
RADAR IMAGE SIMULATION OF SEASONALLY DEPENDENT REFERENCE SCENES Contract Report, 27 Mar. - Sep. 1979
J. C. Holtzman, J. E. Bare, V. H. Kaupp, E. E. Komp, and J. A. Stiles Apr. 1979 238 p refs
(Contract DAAK70-78-C-0082)
(AD-A076119; RSL-TR-370-2; ETL-0188) Avail: NTIS HC A11/MF A01 CSCL 17/9

The results are reported from applying radar image simulation to produce simulated reference scenes of winter conditions for a missile guidance usage. A data base was constructed of the Watertown, New York, test site and simulated radar images were generated. The data base was prepared from historical data for an 'average' winter at the test site. Simulated radar images were produced via the point scattering model and an empirical model was used for predicting the electromagnetic reflectance from the ground, its cover, and overlying snow. Copies of the simulated radar images are included. The results reported were obtained for four (4) simulations corresponding to four specific altitudes in the terminal phases of the trajectory of a guided missile, each successively lower. The simulated images have been produced for testing against actual radar data of the same site via the Correlatron. These tests have not been performed as the actual radar data have not yet been obtained. GRA

N80-18530# Science Applications, Inc., Arlington, Va.
PROCEEDINGS OF THE IMAGE UNDERSTANDING WORKSHOP Semiannual Report, Apr. - Nov. 1979
Lee S. Baumann, ed. et al Nov. 1979 187 p refs Conf held at Los Angeles, 7-8 Nov. 1979
(Contract MDA903-78-C-0095; DARPA Order 3454)
(AD-A077568; SAI-80-974-WA) Avail: NTIS HC A09/MF A01 CSCL 05/8

This document contains the technical papers and outlines of semiannual progress reports presented by the research activities in Image Understanding sponsored by the Information Processing Techniques Office, Defense Advanced Research Projects Agency. The papers were presented at a workshop conducted on 7-8 November 1979 in Los Angeles, California. GRA

N80-19588*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex. Systems and Services Div.
AS-BUILT DESIGN SPECIFICATIONS OF THE LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (LIVES). VOLUME 1: TEST AND APPENDICES
J. Everette, A. Ross, J. Good, C. Horton, D. McCarley, and M. Neves, Principal Investigators Dec. 1979 335 p ERTS
(Contract NAS9-15800)
(E80-10077; NASA-CR-160461; LEC-12904-Vol-1; JSC-14834-Vol-1) Avail: NTIS HC A15/MF A01 CSCL 05B

N80-20884# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
GRAPHIC PRODUCTION OF MAPS ON SCREENS OR PHOTOCOMPOSITION DEVICES [GRAPHISCHE AUSGABE VON KARTEN AUF BILDSCHIRM UND LICHTZEICHENMASCHINE]
Helmut Uhrig *In its* Rept. on Cartography and Geodesy, Ser. 1. Original Rept. No. 73 1977 p 167-169 In GERMAN

Avail: NTIS HC A11/MF A01

Two image retrieval systems are described and compared. A cartographic system is discussed which converts numeric map data into analog images either on a screen or on a precision charting machine. Choice of a system depends on the desired speed and precision. Author (ESA)

N80-20885# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
THE DATA BANK IN THE CARTOGRAPHIC AUTOMATION SYSTEM [DIE DATENBANK IM KARTOGRAPHISCHEN AUTOMATIONSSYSTEM]
Wigand Weber *In its* Rept. on Cartography and Geodesy, Ser. 1. Original Rept. No. 73 1977 p 171-173 In GERMAN

Avail: NTIS HC A11/MF A01

The storage of data points on a magnetic disk unit for use in the production of topographic maps is described. The data are available over telephone lines to multiple users and also accessible for editing and other types of computer manipulation. The advantages of this flexibility are discussed. Author (ESA)

N80-20886# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
OBTAINING SURFACE INFORMATION FOR TOPOGRAPHY AND TOWN AND COUNTRY PLANNING FROM REMOTE SENSING [DAS GEWINNEN VON FLAECHENNUTZUNGSINFORMATIONEN MITTELS FERNERKUNDUNGSVERFAHREN FUER AUFGABEN DER TOPOGRAPHIE UND DER LANDESPLANUNG]
Klaus Naeve *In its* Rept. on Cartography and Geodesy, Ser. 1. Original Rept. No. 73 1977 p 211-217 In GERMAN Original contains color illustrations

Avail: NTIS HC A11/MF A01

Methods developed for future Earth reconnaissance flights are described and discussed. Four test regions with different characteristics were selected: test region 1 (North Germany) for oceanic and coastal studies; test region 2 (Lower Main/Taunus/Wetterau) for town and country planning applications; test region 3 (Upper Rhine/Black Forest) for vegetation and forestry applications; test region 4 (Baltic region) for geological applications. Results obtained with a Bendix-11-channel scanner are presented and compared with LANDSAT 2 data. Different crops and land uses are characterized by color separation utilizing the DIBIAS system and the maximum likelihood method. Author (ESA)

N80-20887# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
DIGITIZING OF GEOMETRIC DATA FOR THEMATIC MAPPING: STATE-OF-THE-ART AND FUTURE DEVELOPMENTS
Klaus Tuerke *In its* Rept. on Cartography and Topographical Meas., Ser. 2: Transl. 1978 p 85-91 refs

Avail: NTIS HC A07/MF A01

The cartographic data structures suitable for thematic computer mapping are surveyed and the data formats and digitizing procedure used in a production oriented environment are described in detail. Presently, interactive digitizing by experienced cartographic personnel is the most economic way of generating a geometric data base; improved techniques of automatic data acquisition, however, will shift the cartographer's function from mass data encoding to interactive correction, generalization, and administration of scanned data. Author (ESA)

N80-22766# National Technical Information Service, Springfield, Va.
COMPUTER AIDED MAPPING. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - 1979
Brian Carrigan Feb. 1980 154 p
(PB80-804305) Avail: NTIS HC $30.00/MF $30.00 CSCL 08B

Approximately 147 citations on the application of computer techniques to cartography from the worldwide journal literature are presented. Automatic mapping, geographic data bases, and computerized photomapping are included. GRA

N80-22767# National Technical Information Service, Springfield, Va.
COMPUTER AIDED MAPPING. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1976 - 1979
Brian Carrigan 29 Apr. 1980 181 p
(PB80-804297) Avail: NTIS HC $30.00/MF $30.00 CSCL 08B

Federally-sponsored research on the application of computer techniques to cartography is cited. Automatic mapping, geographic data bases, and computerized photomapping are included. Contains 174 abstracts. GRA

N80-23717*# Lockheed Electronics Co., Houston, Tex.
OPERATIONS MANUAL FOR THE LANDSAT IMAGERY, VERIFICATION AND EXTRACTION SYSTEM (LIVES)
L. E. Giddings, Principal Investigator Aug. 1979 83 p ERTS
(Contract NAS9-15800)
(E80-10090; NASA-CR-160475; LEC-12903; JSC-14833) Avail: NTIS HC A05/MF A01 CSCL 05B

N80-23718*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
USERS MANUAL FOR THE LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (LIVES)
L. E. Giddings, Principal Investigator Aug. 1979 52 p ERTS
(Contract NAS9-15800)
(E80-10091; NASA-CR-160474; LEC-12902; JSC-14832) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-23722*# Council of State Governments, Lexington, Ky.
INTEGRATED USE OF LANDSAT DATA FOR STATE

RESOURCE MANAGEMENT
William G. Schneider, Jr., Principal Investigator 1979 41 p refs ERTS
(Contract NASw-3140)
(E80-10095; NASA-CR-162809) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-23742*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
COMPUTER PROCESSING SUPPORT, VOLUME 4 Final Report, 1 Dec. 1978 - 30 Nov. 1979
D. A. Landgrebe, Principal Investigator, J. L. Kast, L. A. Kraemer, B. M. Shelley, S. K. Schwingendorf, and T. L. Phillips Nov. 1979 136 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for Intern. Development ERTS
(Contract NAS9-15466; Proj. AgRISTARS)
(E80-10116; NASA-CR-160550; SR-P9-00413; LARJ-120179) Avail: NTIS HC A07/MF A01 CSCL 02C

N80-23747*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
COMPOSITION AND ASSEMBLY OF A SPECTRAL DATA BASE FOR TRANSITION YEAR SPRING WHEAT BLIND SITES
M. H. Trenchard, M. L. Sestak, and M. C. Kinsler, Principal Investigators Jan. 1980 114 p ref Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E80-10121; NASA-CR-160[illegible]; SR-L0-00417; LEMSCO-14069; JSC-16273) Avail: NTIS HC A06/MF A01 CSCL 02C

N80-24733# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
AUTOMATED CARTOGRAPHIC PRODUCTS
Mary G. Clawson Jan. 1980 17 p Presented at the Am. Congr. on Surveying and Mapping/ASP Conf., St. Louis, 9-14 Mar. 1980
(AD-A082107) Avail: NTIS HC A02/MF A01 CSCL 08/2

The Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC) is engaged in researching, planning, compiling, and constructing charts, digital graphics and data bases, and plotter-derived support products through the use of the Advanced Cartographic Production System (ACPS). This presentation highlights the cartographic products generated in support of the military and civil mapping requirements. GRA

N80-24734# Naval Surface Weapons Center, Dahlgren, Va. Science and Mathematics Research Group.
TERRESTRIAL AND CELESTIAL CARTOGRAPHY
A. V. Hershey May 1979 89 p refs
(AD-A082663; NSWC/DL-TR-3789) Avail: NTIS HC A05/MF A01 CSCL 08/2

World Data Bank 1 has been reordered in such a way that the latitudes where coastlines cross meridians are sorted in order of latitude for each minute of longitude. Whether a satellite station is over sea or over land is determined by the parity of the next lower crossing. Stellar data on distance and velocity as well as direction are given in a small catalog. Boundary data for Moon maria, constellations, and the Milky Way are given in a set of files. GRA

N80-25729 International Institute for Applied Systems Analysis, Laxenburg (Austria).
EVALUATION OF AVAILABLE PHOSPHORUS MODELS
M. W. Lorenzen and F. M. Haydock *In its* Hydrol. and Ecol. Models of Shallow Lakes and Reservoirs Oct. 1979 p 107-129 refs
Copyright. Avail: Issuing Activity

The available models that can be used to analyze the effectiveness of possible options for controlling phosphorus loading are evaluated. Methods to compute phosphorus loading rates are reviewed. Land use loading rates and the data base created as part of the National Eutrophication Survey are discussed. Available lake response models for phosphorus are then considered. Three groups of models are studied: one box/one parameter, two box/one parameter, and two box/two parameter. It is shown that the selection of the specific procedures to be used as part of the evaluation of the impact of phosphorus control options is constrained by a number of factors. The large number of lakes to be used as a data base requires a relatively simple approach. The time scale of interest requires a method that can be applied to predict years into the future. The type of control options and specific effects on loading rates requires a tool that considers the direct result of the control. Author (ESA)

N80-25788# Colorado State Univ., Fort Collins. Dept. of Earth Resources.
APPLICATIONS OF REMOTE SENSING TO EMERGENCY MANAGEMENT Final Report, 15 May 1979 - 15 Feb. 1980
William E. Marlatt and E. Bruce Jones (Resources Consultants, Inc., Fort Collins, Colo.) 15 Feb. 1980 81 p
(Contract DCPA01-79-C-0268)
(AD-A082243) Avail: NTIS HC A04/MF A01 CSCL 14/5

Contents: foundations of remote sensing; data acquisition and interpretation; availability of remote sensing technology for disaster response; imaging systems, current and near future satellite and aircraft remote sensing systems; utilization of remote sensing in disaster response; categories of disasters, phases of monitoring activities; recommendations for utilization of remote sensing technology in disaster response; selected reading. GRA

N80-27788# Massachusetts Univ., Amherst. Water Resources Research Center.
THE DEVELOPMENT OF PALIS: A PONDS AND LAKES INFORMATION SYSTEM FOR MASSACHUSETTS
Paul J. Godfrey, Spencer A. Joyner, Jr., Edward L. Goldstein, and Linda Ross Dec. 1979 254 p
(Contract DI-14-34-0001-9023)
(PB80-158579; Pub-108; W80-03902; OWRT-A-124-MASS(1)) Avail: NTIS HC A12/MF A01 CSCL 08H

A state-of-the-art information system for managing ponds and lakes resources at the state level was accomplished for Massachusetts by (1) assessing the quality and quantity of existing ponds and lakes information, (2) surveying the state of the art of computerized management information systems including water resources information systems, (3) evaluating the implications for state agencies of computerizing in a single system all the ponds and lakes information they already possess and (4) designing a management information system for Massachusetts ponds and lakes information. The design included the creation of a complex data base structure which was suited to existing computer software packages, and the development of a functioning pilot demonstration system based on state agency for 20 lakes and ponds. GRA

N80-28773*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
AS-BUILT DESIGN SPECIFICATION FOR THE BRAZIL AND CHINA MONTHLY DATA BASES
K. Williams, Principal Investigator May 1977 20 p ERTS
(Contract NAS9-15200)
(E80-10172; NASA-CR-160677; LEC-10573; JSC-12892) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-28779*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
PROGRAM DOCUMENTATION: FINAL DESIGN SPECIFICATION FOR DOT DATA BASE UPDATE DECK CONVERSION PROGRAM (DOTDEC)
Jeanne Gor, Principal Investigator Jul. 1977 29 p ERTS
(Contract NAS9-15200)
(E80-10178; NASA-CR-160647; LEC-10969; JSC-12858) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-28780*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.
FINAL DESIGN SPECIFICATION FOR ERIPS FIELDS DATA BASE DECK CONVERSION
Cheevon Bo-Linn, Principal Investigator Aug. 1977 41 p ERTS
(Contract NAS9-15200)
(E80-10179; NASA-CR-160646; LEC-10960; JSC-12655) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-28784*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
DESIGN SPECIFICATION FOR DOT DATA BASE UPDATE DECK CONVERSION PROGRAM (DOTDEC)
Jeannie Gor, Principal Investigator Jun. 1977 8 p ERTS
(Contract NAS9-15200)
(E80-10183; NASA-CR-160681; LEC-10790; JSC-12958) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-28788*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
FUNCTIONAL DESIGN SPECIFICATION FOR ENHANCEMENT OF THE AUTOMATIC STATUS AND TRACKING SYSTEM SOFTWARE
D. K. McCarley, J. M. Everette, and K. P. Eckel, Principal Investigators Sep. 1977 60 p ERTS
(Contract NAS9-15200)
(E80-10190; NASA-CR-160624; LEC-11199; JSC-13110) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-28823*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MARK 3 SYSTEM OVERVIEW
T. A. Clark *In its* Radio Interferometry Jul. 1980 p 285-290 refs
Avail: NTIS HC A20/MF A01 CSCL 08E

The Mark 3 very long baseline interferometry (VLBI) system, comprising a complete end to end VLBI system optimized for both high accuracy geodesy and radio astronomy, is described. The data flow, the data base handler system, and the field station component and configurations are briefly discussed. The use of mobile and transportable stations allows measurements to be taken from a large number of sites with relatively few sets of equipment. Fixed stations form a long term reference network for tying together the measurements with the mobile and transportable stations. M.G.

N80-28831*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE MARK 3 DATA BASE HANDLER
James W. Ryan, Chopo Ma, and Bruce R. Schupler (Computer Sciences Corp., Greenbelt, Md.) *In its* Radio Interferometry Jul. 1980 p 337-346
Avail: NTIS HC A20/MF A01 CSCL 05B

A data base handler which would act to tie Mark 3 system programs together is discussed. The data base handler is written in FORTRAN and is implemented on the Hewlett-Packard 21MX and the IBM 360/91. The system design objectives were to (1) provide for an easily specified method of data interchange among programs, (2) provide for a high level of data integrity, (3) accommodate changing requirments, (4) promote program accountability, (5) provide a single source of program constants, and (6) provide a central point for data archiving. The system consists of two distinct parts: a set of files existing on disk packs and tapes; and a set of utility subroutines which allow users to access the information in these files. Users never directly read or write the files and need not know the details of how the data are formatted in the files. To the users, the storage medium is format free. A user does need to know something about the sequencing of his data in the files but nothing about data in which he has no interest. M.G.

N80-28861# Defense Mapping Agency Aerospace Center, St. Louis, Mo. Advanced Technology Div.
DIGITAL IMAGE TECHNOLOGY 1980: EMERGING PRODUCTION APPLICATIONS Final Report
Marshall B. Faintich 5 Mar. 1980 19 p ref Submitted for publication Original contains color illustrations
(AD-A085163) Avail: NTIS HC A02/MF A01 CSCL 08/2

The Defense Mapping Agency Aerospace Center has developed a program to exploit digital image technology for the advancement of mapping, charting, and geodesy. Primary investigations include image processing, analysis, and display techniques, and computer image generation. A dramatic impact has been made in the ability to produce, analyze, and validate various digital data bases produced by the Defense Mapping Agency by applying state-of-the-art digital image technology concepts to the development of new interactive prototype and production systems. GRA

N80-29786*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
AS-BUILT DESIGN SPECIFICATION FOR THE CAMS IMAGE-100 HYBRID SYSTEM. VOLUME 1: SYSTEM DESIGN
L. E. Giddings, Principal Investigator Aug. 1977 322 p ERTS 2 Vol.
(Contract NAS9-15200)
(E80-10207; NASA-CR-160644; LEC-10822-Vol-1; JSC-13030-Vol-1) Avail: NTIS HC A14/MF A01 CSCL 05B

N80-29796*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
AS-BUILT DESIGN SPECIFICATION FOR THE YIELD ESTIMATION SUBSYSTEM (YES) MONTHLY YIELD DATA BASE AND SUPPORTING PROGRAMS
D. Cook and C. Siemons, Principal Investigators Feb. 1977 124 p ERTS
(Contract NAS9-15200)
(E80-10218; NASA-CR-160641; LEC-10034; JSC-12537) Avail: NTIS HC A06/MF A01 CSCL 05B

N80-29811*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.
AS-BUILT DESIGN SPECIFICATION FOR THE INDIA MONTHLY DATA BASE
K. Williams, Principal Investigator Feb. 1977 20 p ERTS
(Contract NAS9-15200)
(E80-10264; NASA-CR-160643; LEC-10253; JSC-12582) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-29824*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
COMPOSITION AND ASSEMBLY OF A SPECTRAL DATA BASE FOR CORN AND SOYBEAN MULTICROP SEGMENTS
M. H. Trenchard, M. L. Sestak, and M. C. Kinsler, Principal Investigators Jun. 1980 338 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E80-10281; NASA-CR-160726; AR-10-00407; LEMSCO-14250; JSC-13723) Avail: NTIS HC A15/MF A01 CSCL 20C

N80-30823*# Purdue Univ., Lafayette, Ind. Lab for Applications of Remote Sensing.
[REMOTE SENSING RESEARCH STUDIES] Final Report, 1 Dec. 1978 - 30 Nov. 1979
D. A. Landgrebe Nov. 1979 128 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS
(Contract NAS9-15466; Proj. AgRISTARS)
(E80-10117; NASA-CR-160551; SR-P9-00414; LARS-120279) Avail: NTIS HC A07/MF A01 CSCL 02C

N80-30837*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

DETAIL DESIGN SPECIFICATION FOR ENHANCEMENT OF THE AUTOMATIC STATUS AND TRACKING SYSTEM SOFTWARE

D. K. McCarley, Principal Investigator, J. M. Everette, and K. P. Eckel Nov. 1977 102 p ERTS
(Contract NAS9-15200)
(E80-10254; NASA-CR-160634; LEC-11512; JSC-13789) Avail: NTIS HC A06/MF A01 CSCL 05B

N80-30846*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR PHASE 3 MODEL AREAS ADDED TO THE MONTHLY DATA BASE OF THE US

K. Williams, Principal Investigator Mar. 1977 28 p ERTS
(Contract NAS9-15200)
(E80-10263; NASA-CR-160689; LEC-10354; JSC-12709) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-30849*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

USER'S GUIDE FOR THE YIELD ESTIMATION SUBSYSTEM DATA MANAGEMENT SYSTEM (YESDAMS)

Roy Devenport and Mike Sestak, Principal Investigators Apr. 1978 51 p ERTS
(Contract NAS9-15200)
(E80-10276; NASA-CR-160710; LEC-12184; JSC-13985) Avail: NTIS HC A04/MF A01 CSCL 05A

N80-30862*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

MAXIMAL ANALYSIS LABELING PROCEDURE (PRELIMINARY)

J. M. Disler, Principal Investigator Feb. 1980 37 p refs
Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E80-10294; NASA-CR-160865; FC-LO-00700; JSC-16399) Avail: NTIS HC A03/MF A01 CSCL 02C

N80-31869# Army Engineer Topographic Labs., Fort Belvoir, Va.

ERRORS IN AUTOMATIC PASS POINT MENSURATION USING DIGITAL TECHNIQUES

Michael A. Crombie Jun. 1980 22 p refs
(DA Proj. 4A7-62707-A-855)
(AD-A087443; ETL-0232) Avail: NTIS HC A02/MF A01 CSCL 08/2

A technique for automatically measuring pass points from digital stereo images is evaluated. Numerical estimates of x-parallax and y-parallax for a specific stereo pair of images is presented as a function of terrain relief. GRA

N80-32813*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

OPERATION PLAN FOR THE HIGH DENSITY TAPE/LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (HDT/LIVES) DATA PROCESSING SUPPORT

A. J. Bowen, Jr., Principal Investigator Jun. 1980 28 p refs
(Contract NAS9-15800)
(E80-10322; NASA-CR-160736) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-32814*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR CCITS PROCESSOR PROGRAM

R. F. Hansen, Principal Investigator Feb. 1979 65 p ERTS
(Contract NAS9-15800)
(E80-10323; NASA-CR-160738; LEC-13077; JSC-14704) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-32826*# Mississippi State Univ., Mississippi State.

APPLICATION OF REMOTE SENSING TO STATE AND REGIONAL PROBLEMS Semiannual Progress Report, 1 May - 31 Oct. 1979

W. Frank Miller, Dale A. Quattrochi, Bradley D. Carter, Gary K. Higgs, and Jimmy L. Solomon, Principal Investigators 1 Nov. 1979 55 p Original contains color illustrations ERTS
(Grant NGL-25-001-054)
(E80-10338; NASA-CR-163418; SAPR-12) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-32829*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

STEREOSAT: A PROPOSED PRIVATE SECTOR/GOVERNMENT JOINT VENTURE IN REMOTE SENSING FROM SPACE

Richard L. Anglin 1 Aug. 1980 130 p refs
(Contract NAS7-100)
(NASA-CR-163569; JPL-Pub-80-70) Avail: NTIS HC A07/MF A01 CSCL 22A

Stereosat, a free flying Sun synchronous satellite whose purpose is to obtain worldwide cloud-free stereoscopic images of the Earth's land masses, is proposed as a joint private sector/government venture. A number of potential organization models are identified. The legal, economic, and institutional issues which could impact the continuum of potential joint private sector/government institutional structures are examined. S.F.

N80-33831*# South Dakota State Univ., Brookings. Remote Sensing Inst.

IMPACT OF CELL SIZE ON INVENTORY AND MAPPING ERRORS IN A CELLULAR GEOGRAPHIC INFORMATION SYSTEM

Michael E. Wehde, Principal Investigator Apr. 1979 96 p refs ERTS
(Grant NGL-42-003-007)
(E80-10315; NASA-CR-163403; SDSU-RSI-79-03) Avail: NTIS HC A05/MF A01 CSCL 08B

The author has identified the following significant results. The effect of grid position was found insignificant for maps but highly significant for isolated mapping units. A modelable relationship between mapping error and cell size was observed for the map segment analyzed. Map data structure was also analyzed with an interboundary distance distribution approach. Map data structure and the impact of cell size on that structure were observed. The existence of a model allowing prediction of mapping error based on map structure was hypothesized and two generations of models were tested under simplifying assumptions.

N80-33847# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.

APPLICATION OF THEMATIC MAPPING TECHNIQUES IN TERRAIN ANALYSIS

Theodore W. Howard Jan. 1980 9 p refs Presented at the ACSM/ASP Conf.
(AD-A089061) Avail: NTIS HC A02/MF A01 CSCL 08/2

The mission to support the Department of Defense (DoD) with terrain information has recently become the responsibility of the Defense Mapping Agency (DMA). The techniques employed to produce data bases of terrain conditions and the synthesizing of this data base information into terrain analysis products are critical in supporting mission requirements. Thematic mapping procedures provide the mechanism by which remote sensors, interpretation techniques, thematic subjects, data analysis techniques, and products can be examined in terms of production feasibility and capabilities. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

A76-25960 The role of environmental data banks in energy resource development. J. E. Jones and G. E. Smith (Kentucky, University, Lexington, Ky.). In: International Conference on Environmental Sensing and Assessment, Las Vegas, Nev., September 14-19, 1975, Proceedings. Volume 2.
New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 1 25-6 to 5 25-6. 13 refs.

The paper presents a rationale for the implementation of an environmental data, information and literature bank which is being established for Kentucky's energy development program. Main concern of the bank is the environmental, social, and economic aspects of producing clean solid, liquid and gaseous fuels from coal. The data bank promotes information exchange between other related governmental and private projects and the energy development community. An overview of coal conversion - the potential magnitude of the industry, the environmental considerations, and the general types of information resources of environmental assessment - is presented. P.T.H.

A76-28817 System control in the Central Electricity Generating Board. J. W. Dillow, U. G. Knight, and J. Hewson. In: International Federation of Automatic Control, Triennial World Congress, 6th, Boston and Cambridge, Mass., August 24-30, 1975, Proceedings. Part 2. Pittsburgh, Pa., Instrument Society of America, 1975, p. 24.2 1-24.2 9.

The development of system control facilities in the context of CEGB system characteristics is outlined. Present facilities are described. Two major developments are now in hand. One is an enhanced data transmission network which will provide improved access for operating staffs to local and central computing facilities and data banks; it will be used mainly for assembly of historic operating data and assessment of future system conditions. In the other hand, a large part of the existing analog telemetry system will be replaced by a digital system. Ergonomic aspects of the developments are mentioned. The paper concludes with a brief appraisal of possible future developments. (Author)

A76-45875 The storage of low grade thermal energy using phase change materials. K. K. Pillai and B. J. Brinkworth (University College, Cardiff, Wales). *Applied Energy*, vol. 2, July 1976, p. 205-216. 9 refs.

Phase change materials (PCMs) offer a convenient means of storing low grade thermal energy within compact systems, however, the selection of the proper PCM depends entirely on the particular application. The difficulties in predicting the melting behavior of PCMs have limited the production of working designs. The generalized properties of three categories of PCM - paraffins, non-paraffin organic solids, and hydrated salts - are described. A number of phase change materials are given in an appendix, along with their transition temperature, heat of transition, and type of transition. A data bank suitable for selecting materials with desired combinations of properties is currently being set up. V.P.

A77-42632 Electric energy alternatives appraisal for New York State. M. Beckur (Rensselaer Polytechnic Institute, Troy, N.Y.) and A. Kaufman (New York State, Dept. of Public Service, Albany, N.Y.). *(Institute of Electrical and Electronics Engineers, American Society of Mechanical Engineers, and American Society of Civil Engineers, Joint Power Generation Conference, Buffalo, N.Y., Sept. 19-23, 1976.) IEEE Transactions on Power Apparatus and Systems,* vol. PAS-96, July-Aug. 1977, p. 1173-1178; Discussion, p. 1178. Research supported by the New York State Energy Research and Development Authority.

This paper describes a cooperative program involving staff of RPI, New York State, and the General Electric Company for appraisal of electric energy alternatives. The program has involved acquisition of a data base describing both established and potential technologies for the generation of electric energy, identification of relevant factors, considerations and policies with potential for influencing strategy selections, and the development of methods for processing the available information. This paper will provide a overview of the program and will discuss specific examples of results obtained to date. (Author)

A77-48525 # Experience in constructing a solar energy cadastral survey (Opyt postroeniia gelioenergeticheskogo kadastra). R. B. Salieva (Tashkentskii Elektrotekhnicheskii Institut Sviazi, Tashkent, Uzbek SSR). *Geliotekhnika*, no. 3, 1977, p. 56-64. 18 refs. In Russian.

Basic purposes of a solar energy cadastral survey incorporating objective numerical data based on an adequate stochastic model are outlined. The survey is intended to provide a data base for exploitation and storage of solar energy and for forecasting of favorable insolation conditions, with benefits in electric power, communications, refrigeration and heating, irrigation, and water resources management. The microstructure of solar radiation exposure is broken down from a continuous series to phase-homogeneous periods lasting one calendar month. Histograms, tables, and graphs are compiled as aids in determining repeatability of solar radiation patterns. R.D.V.

A77-49019 Survey of the applications of solar thermal energy to industrial process heat. M. D. Fraser (InterTechnology Corp., Warrenton, Va.). In: Sharing the sun: Solar technology in the seventies; Proceedings of the Joint Conference, Winnipeg, Canada, August 15-20, 1976. Volume 5. Cape Canaveral, Fla., International Solar Energy Society, 1976, p. 46-57. Contract No. E(11-1)-2829.

The considered survey constitutes an initial project which is to provide data useful to ERDA to determine the scope, extent, and direction of future work related to the utilization of solar thermal energy for industrial processing applications. The first task is to obtain information concerning the use of process heat by industry in its production processes. The overall objective of the second task is to identify the characteristics of various solar thermal energy systems with regard to their ability to provide the process heat. To analyze the economics of solar thermal energy employed in industrial applications, a procedure has been developed which will be used to calculate the cost of solar energy for the different systems as a function of temperature and solar region. G.R.

A78-11288 Hourly direct-normal solar radiation data tapes for the United States. C. M. Randall, M. E. Whitson, Jr. (Aerospace Corp., Los Angeles, Calif.), and E. C. Boes (Sandia Laboratories, Albuquerque, N. Mex.). In: International Solar Energy Society, Annual Meeting, Orlando, Fla., June 6-10, 1977, Proceedings. Sections 14-25. Cape Canaveral, Fla., International Solar Energy Society, 1977, p. 14-26 to 14-30. ERDA-supported research.

Improved estimates of hourly direct-normal insolation have been prepared for the 26 United States sites where the hourly total-hemispheric insolation values have recently been reviewed and corrected by the U.S. National Oceanic and Atmospheric Administration (NOAA). These computer compatible data tapes covering up to 25 years, are in the NOAA SOLMET format and are intended for use in solar energy systems design and performance analysis. The improved estimation procedures, which are the principal topic of this paper, are based on simultaneous observations of hourly direct-normal and total-hemispheric insolation from 5 United States locations with widely differing climates. The estimation algorithm reported here reproduces both the distribution of direct insolation values as well as their mean values by statistical techniques constrained by limits which the radiative transfer processes impose. (Author)

A78-20618 **Energy supply-demand integrations to the year 2000: Global and national studies.** Edited by P. S. Basile. Cambridge, Mass. and London, MIT Press, 1977. 720 p. $29.95.

Energy supplies and demands are projected for Western European nations, Canada, the U.S., Mexico, and Japan during the period 1985 to 2000. Five scenarios for the 1972-1985 period and four for the period to 2000 are considered; the scenarios involve various economic growth rates, energy price structures, national energy policies, and principal replacement fuels used to fill the gap left by declining petroleum and natural gas production. Emphasis is placed on presenting information on a nation-by-nation basis that may aid in solving the problem of imbalance between limited supplies of certain fuels and accelerating demand for such fuels. J.M.B.

A78-36862 **Development of a solar-power cadaster.** R. B. Salieva (Tashkentskii Elektrotekhnicheskii Institut Sviazi, Tashkent, Uzbek SSR). *(Geliotekhnika*, no. 3, 1977, p. 56-64.) *Applied Solar Energy*, vol. 13, no. 3, 1977, p. 43-48. 18 refs. Translation.

Basic purposes of a solar energy cadastral survey incorporating objective numerical data based on an adequate stochastic model are outlined. The survey is intended to provide a data base for exploitation and storage of solar energy and for forecasting of favorable insolation conditions, with benefits in electric power, communications, refrigeration and heating, irrigation, and water resources management. The microstructure of solar radiation exposure is broken down from a continuous series to phase-homogeneous periods lasting one calendar month. Histograms, tables, and graphs are compiled as aids in determining repeatability of solar radiation patterns. R.D.V.

A79-17466 **The analysis by stochastic modelling of solar systems for space and water heating.** J. Haslett (Trinity College, Dublin, Ireland). In: Sun: Mankind's future source of energy; Proceedings of the International Solar Energy Congress, New Delhi, India, January 16-21, 1978. Volume 3. Elmsford, N.Y., Pergamon Press, Inc., 1978, p. 1393-1397. 20 refs. Research supported by the National Science Council.

This paper discusses the use of methods of applied probability in the modeling of active systems for collecting, storing and distributing solar thermal energy. It is seen that these methods are particularly convenient for the calculation of the long term performance of such systems. In comparison with detailed hour-by-hour simulations the method is shown to yield adequate accuracy for economic calculations, except when the panel area/storage volume ratio is high. The required computational effort is however negligible, and the data base is compact. Further, being fully analytic, the method may be generalized to other systems. (Author)

A79-45205 * **A comprehensive solar energy system analysis data base in Huntsville, Alabama.** J. P. Goddard (Alabama, University, Huntsville, Ala.). In: Application of solar energy; Proceedings of the Third Southeastern Conference, Huntsville, Ala., April 17-19, 1978. Huntsville, Ala., UAH Press, 1978, p. 43-52. 6 refs. Research supported by the U.S. Department of Energy; Contract No. NAS8-31293.

The history of a comprehensive solar energy system analysis data base developed by NASA/Marshall Space Flight Center and the University of Alabama is presented, along with its current status. The Marshall Information Retrieval and Data Storage (MIRADS) system was chosen for the data base, and feedback systems were arranged to cope with changes in the needs of the program management for the type of data gathered. The final structure of the data base consists of 22 files divided into 6 topical sections: summaries, climatological, utility rates, architectural, equipment, and economics. The data base offers help to the solar industry in two ways: it provides information and it serves as a model for users trying to establish the climatic and socioeconomic variables they should take into account when they examine a potential market for solar energy equipment. V.T.

A79-48021 **The 'Facility Data Base' or data bank on energy facilities (La 'Facility Data Base' ou banque de données sur des installations énergétiques).** M. Cellerier (International Institute for Applied Systems Analysis, Laxenburg, Austria). *Revue de l'Energie*, vol. 30, June-July 1979, p. 476-481. In French.

The Facility Data Base is a principle tool in the WELMM (water, energy, land, materials, manpower) method, which comprises a systems approach to energy resouces management. In this paper, the structure and operation of the Facility Data Base are described. The classification of energy facilities in the data bank according to industrial stage of the energy process, maturity of process technology and primary source of energy in order to characterize the various components of an energy conversion chain is discussed, and the types of qualitative and quantitative information on the technical, economic and environmental aspects of facility construction and operation are indicated. The data collection procedure is outlined, and the techniques used in computerizing and retrieving the information are illustrated. A.L.W.

N76-12466* Auburn Univ., Ala.
ECASTAR METHODOLOGY
In its ECASTAR: Energy Conserv. An Assessment of Systems, Technol. and Requirements Sep. 1975 p 10-15

CSCL 10A

The methodology used for the ECASTAR study was described. A systems approach was utilized, in conjunction with the following tools: input/output economic analysis, net economics, and net energetics. Some of the considerations between the objective of ECASTAR, which is to assess the potential for and impacts of various energy conservation actions, were listed. These include: data base, constraints and criteria, identification and classification of energy conservation actions, relationship between actions of the conservation sector and requirements of other sectors, evaluation of actions with respect to constraints and criteria, evaluation of impacts of energy conservation actions, and presentation of the results. Each one of these topics was discussed. Y.J.A.

N76-13602# Aerospace Corp., El Segundo, Calif. Energy and Resources Div.
SOLAR THERMAL CONVERSION MISSION ANALYSIS. VOLUME 2: SOUTHWESTERN UNITED STATES. DEMAND ANALYSIS
15 Nov. 1974 178 p refs 5 Vol.
(Contract NSF C-797)
(PB-242899/3; ATR-74(7417-16)-2-Vol-2; NSF/RA/N-74-205B-Vol-2) Avail: NTIS HC $7.50. HC also available from NTIS $30.00/set of 5 reports as PB-242897-SET CSCL 10B

Computer programs, data base, and forecast methodology capable of characterizing the hourly electric power demand for selected Southwestern United States load centers from 1980 to 2000 are discussed. GRA

N76-15635# Gordian Associates, Inc., New York.
INDUSTRIAL ENERGY CONSERVATION. THE CCMS PILOT STUDY. PROJECT AREA 1: AN INTERNATIONAL DATA BASE
25 Jun. 1974 74 p Sponsored by FEA
(PB-243923/0; FEA/D-74/142) Avail: NTIS HC $4.50 CSCL 10A

Information is presented on a data base already established for nine U. S. industries: aluminum, cement, copper, glass, paper, petroleum refining, plastic products, styrene butadiene rubber, and steel. GRA

N76-22891# Federal Energy Administration, Washington, D.C. Office of Energy Data Policy.
ENERGY INFORMATION IN THE FEDERAL GOVERNMENT: ENERGY INFORMATION LOCATOR SYSTEM
J. Paul Galliker Nov. 1975 1019 p
(PB-246703/3; FEA/B-75/375) Avail: NTIS HC $28.25 CSCL 10A

Energy and energy-related programs from 44 agencies, bureaus, and commissions in the Federal Government are described. The identification process is developed by the aggregation of energy data descriptors/characteristics (i.e., data on the geographic location of anthracite coal exploration) by the use of energy function matrices that are displayed which, in turn, are linked to subsequent Federal agency summaries and their energy program summaries. A description Directory of 98 existing energy data bases and files is also contained in addition to an overview of the project, techniques and documents employed in the collection of the data. GRA

N76-22706# Environmental Policy Inst., Washington, D.C.
THE NEED FOR ENERGY FACILITY SITES IN THE UNITED STATES: 1985 THROUGH 2000 Final Report
Marc Messing 30 Jun. 1975 68 p refs
(Contract EQ5AD272)
(PB-248153/9; EQ-517514272) Avail: NTIS HC $4.50 CSCL 10A

The Federal Energy Administrations's (FEA's) projections for needed new facilities are analyzed by comparing FEA's data base and forecast methodology used in the Project Independence Report with other estimates of total energy and electrical energy demands. Estimates of the demand for new facilities are compared with current utility plans for new facilities through 1985, and the number of new sites necessary to meet projected facility demands is estimated. A survey of current state laws and provisions for meeting demands on the state level is included. GRA

N76-28852*# Western New Mexico Univ., Silver City.
AN INVESTIGATION OF THE ACCEPTANCE OF SOLAR HEATING AND COOLING IN THE HOUSING INDUSTRY IN NEW MEXICO Final Technical Report, 1 Aug. 1975 - 31 Jul. 1976
Craig R. Lundahl, James Calvert Scott, and David M. Dennis 31 Jul. 1976 286 p
(Grant NsG-902)
(NASA-CR-148528) Avail: NTIS HC $9.25 CSCL 10A

A data base of information relating to the acceptability of solar-energy technology in the New Mexican housing industry was developed. Topics examined include: (1) the factors which influence the adoption of solar-energy systems in the New Mexican housing industry; (2) the degree of acceptability of various solar factors among New Mexican consumers, architects, contractors, financiers, energy suppliers, and governmental officials; and (3) the current attitudes toward the acceptability of solar energy factors in the New Mexican housing industry. Author

N76-28870# Mathematica, Inc., Princeton, N.J.
COMPREHENSIVE EVALUATION OF ENERGY CONSERVATION MEASURES, APPENDICES Final Report
Dilip R. Limaye, John R. Sharko, Jeffrey P. Price, and Joseph A. Orlando Mar. 1975 143 p refs
(Contracts EPA-68-01-2440; EPA-68-01-2445)
(PB-250825/7; EPA-230/1-75-004) Avail: NTIS HC $6.00 CSCL 13A

Appendices provide detailed methodology, data base and technical discussions in the areas of energy consumption, space heating, hot water heating, heat pumps, and total energy systems. GRA

N76-32860*# Alabama Univ., Huntsville. Center for Environmental and Energy Studies.
SOLAR HEATING AND COOLING TECHNICAL DATA AND SYSTEMS ANALYSIS Progress Report, Sep. 1975 - Jun. 1976
D. L. Christensen Jun. 1976 57 p refs
(Contract NAS8-31293)
(NASA-CR-150006) Avail: NTIS HC $4.50 CSCL 10A

The acquisition and processing of selected parametric data for inclusion in a computerized Data Base using the Marshall Information Retrieval and Data System (MIRADS) developed by NASA-MSFC is discussed. This data base provides extensive technical and socioeconomic information related to solar energy heating and cooling on a national scale. A broadly based research approach was used to assist in the support of program management and the application of a cost-effective program for solar energy development and demonstration. Author

N76-33823*# Alabama Univ., Huntsville. Center for Environmental and Energy Studies.
SOLAR HEATING AND COOLING TECHNICAL DATA AND SYSTEMS ANALYSIS Interim Status Report, Sep. 1975 - Aug. 1976
D. L. Christensen Sep. 1976 38 p
(Contract NAS8-31298)
(NASA-CR-150012) Avail: NTIS HC $4.00 CSCL 10A

The accomplishments of a project to study solar heating and air conditioning are outlined. Presentation materials (data packages, slides, charts, and visual aids) were developed. Bibliographies and source materials on materials and coatings, solar water heaters, systems analysis computer models, solar collectors and solar projects were developed. Detailed MIRADS computer formats for primary data parameters were developed and updated. The following data were included: climatic, architectural, topography, heating and cooling equipment, thermal loads, and economics. Data sources in each of these areas were identified as well as solar radiation data stations and instruments. D.M.L.

N76-33899# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
AN APPLICATION OF A GENERALIZED MANAGEMENT INFORMATION SYSTEM TO ENERGY POLICY AND DECISION MAKING: THE USER'S VIEW
John J. Donovan, Louis M. Gutentag, Stewart E. Madnick, and Grant N. Smith May 1975 25 p refs Submitted for publication Sponsored by New England Regional Commission, Boston
(PB-252980/8; MIT-EL-75-008) Avail: NTIS HC $3.50 CSCL 10A

An approach to the development and use of management information systems is presented. This approach is particularly applicable to systems that: have several types of users with varying degrees of sophistication; have complex or changing security requirements; exhibit complex and changing interrelationships in data; must be built quickly and inexpensively; have complex data validation requirements; and/or must meet changing needs. The type of system described is hierarchical because it may be accessed at distinct levels: A casual user has high level primitives to work with, while an experienced user has more flexible but more detailed low-level primitives. Hierarchical systems also provide for ease of debugging, independence of hardware, and a basis for investigating properties of completeness, integrity, correctness, and performance. GRA

N77-19833# InterTechnology Corp., Warrenton, Va.
INTERTECHNOLOGY CORPORATION PROPOSED SYSTEMS LEVEL PLAN FOR SOLAR HEATING AND COOLING, COMMERCIAL BUILDINGS. VOLUME 2: NATIONAL SOLAR DEMONSTRATION PROGRAM
May 1976 284 p 3 Vol.
(Contract E(11-1)-2688)
(COO/2688-76/6-Vol-2) Avail: NTIS HC A13/MF A01

Program function, program structure, specifications for input data, description of calculations performed, output format and lists, brief program outline, storage map, and source program outline and listings for solar heating and cooling system of non-residential buildings are presented. ERA

N77-21570*# Kentucky Univ., Lexington. College of Engineering.

A THERMOCHEMICAL DATA BANK FOR CYCLE ANALYSIS
R. H. Carty, J. E. Funk, W. L. Conger, M. A. Soliman (Riyadh Univ., Saudi Arabia), and K. E. Cox (New Mexico Univ.) *In* Miami Univ. First World Hydrogen Energy Conf. Proc., Vol. 1 Mar. 1976 6 p refs

(Grant NGR-18-001-086)
Avail: NTIS HC A99/MF A01

The use of a computer program PAC-2 to produce a thermodynamic data bank for various materials used in water splitting cycles is described. The sources of raw data and a listing of 439 materials for which data are available are presented. The use of the data bank in conjunction with two other programs, CEC-72 and HYDRGN, is also discussed. The integration of these three programs implement an evaluation procedure for thermochemical water splitting cycles. CEC-72 is a program used to predict the equilibrium composition of the various chemical reactions in the cycle. HYDRGN is a program which is used to calculate changes in thermodynamic properties, work of seperation, amount of recycle, internal heat regeneration, total thermal energy, and process thermal efficiency for a thermochemical cycle.
Author

N77-21687# Brookhaven National Lab., Upton, N.Y. Dept. of Applied Science.
ENERGY MODEL DATA BASE PROGRAM
Murrey D. Goldberg, Walter A. Sevian, Ann W. Reisman, and Paula Newhouse Jun. 1976 20 p
(Contract E(30-1)-16)
(BNL-21545) Avail: NTIS HC A02/MF A01

Models developed by the National Center for Analysis of Energy Systems (NCAES) at Brookhaven were developed principally to provide a descriptive or normative overview of the technological aspects of the national energy system in order to permit analysis and intercomparison of the impact of future technological options. To meet the needs of the NCAES for high-quality numeric data, a flexible, open-ended and model-independent computerized data system was developed and named the Energy Model Data Base (EMDB). It was designed to accept files of numeric quantities useful in energy systems modeling, together with the documentation which indicates the source and quality of the numbers. As noted, the EMDB is independent of any particular model, but choices made in both content and format reflect the requirements of the NCAES modeling programs. A non-technical description of the content of the EMDB is given, and its linkage to Brookhaven optimization and network flow models is indicated. ERA

N77-23609# Oak Ridge National Lab., Tenn.
DEVELOPMENT AND APPLICATIONS OF SPATIAL DATA RESOURCES IN ENERGY RELATED ASSESSMENT AND PLANNING
R. J. Olson, F. G. Goff, and J. S. Olson 1976 9 p refs Presented at Proc. of the Advan. in Retrieval Technol. as Related to Inform. Systems, Arlington, Va., 20 Oct. 1976
(Contract W-7405-eng-26)
(CONF-761017-1) Avail: NTIS HC A02/MF A01

An investigation of potential changes in vegetation patterns related to predicted temperature changes from increased atmospheric CO2 is presented to illustrate an ongoing application of the data resources. Other themes include coal extraction in Appalachia, landscape patterns, habitat and population dynamics of selected biological species, and energy facility siting. ERA

N77-24801# California Univ., Livermore. Lawrence Livermore Lab.
RESEARCH LEADING TO THE PRODUCTION AND EARLY USE OF NUMERIC DATA BANKS OF MATERIAL PROPERTIES AND SYSTEM ANALYSES Quarterly Progress Report, Apr. - Jun. 1976
Viktor E. Hampel 16 Sep. 1976 31 p refs
(Contract W-7405-eng-48)
(UCRL-50038-76-2) Avail: NTIS HC A03/MF A01

A bibliographic data base for flywheel energy-storage systems was created. Work was continued on the systems structure for the energy-storage data bases. A test of this prototype data-base structure was begun for data on properties of salts used in thermal storage systems. Preliminary definitions were developed for data bases to permit the analysis and intercomparison of energy-storage systems. ERA

N77-28610*# Wyle Labs., Inc., Huntsville, Ala.
ASSEMBLY AND TESTING OF A 1.8 BY 3.7 METER FRESNEL LENS SOLAR CONCENTRATOR Final Report
J. E. Robertson May 1977 72 p refs
(Contract NAS8-31662)
(NASA-CR-150300; TM-77-5) Avail: NTIS HC A04/MF A01 CSCL 10A

A project was initiated to establish a technical data base on line focusing acrylic Fresnel lenses for use in a solar collector system that could generate temperatures in the range of 200 C to 370 C. The effort was originally directed toward electric power generation in the 100 to 10,000 kWe range using a distributed collector approach. However, as the program progressed, it centered on the development of a concentrator/collector subsystem concept that could meet the general requirement of thermal delivery within the 200 C to 370 C range. The expanded list of possible applications includes commercial heating/cooling and industrial process heat as well as electric power generation.
D.M.L.

N77-28663# Sandia Labs., Albuquerque, N. Mex.
EFFECTS OF SPECTRAL VARIATIONS ON SILICON CELL OUTPUT
E. C. Boes and I. J. Hall 1976 14 p Presented at Terrestrial PV Measurements Workshop, Baton Rouge, Louisiana, 10 Nov. 1976
(Contract E(29-1)-789)
(SAND-76-9142; Conf-761129) Avail: NTIS HC A02/MF A01

The performance of silicon solar cell at a specific location is usually predicted by multiplying the solar radiation incident at the site by the solar cell's efficiency. This efficiency is specified as the ratio of the cell's output to the radiant energy input to the cell under specified conditions. It would be better to use a procedure which takes into account the fact that the performance of silicon solar cells depends upon the spectral distribution of the incoming energy. This is generally not possible because there are very few records of the spectral distribution of terrestrial solar radiation. One existing data source consists of spectral measurements of daily, total-horizontal radiation. These data have been analyzed to determine the magnitude and character of the effects in silicon cell output resulting from real variations in the terrestrial solar spectrum. ERA

N77-31080# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
A USER'S GUIDE TO THE MIT WORLD ENERGY DEMAND DATA BASE. PART 2: DATA INDEX
May 1976 172 p
(Grant NSF SIA-75-00738)
(PB-266830/9; MIT/EL-76/011WP-Pt-2; NSF/RA-760474-Pt-2) Avail: NTIS HC A08/MF A01 CSCL 10A

This data base is assembled as part of an econometric study of world energy demand. The work is part of a project to develop analytical models of the world oil market. The data description listing is designed to be used both as a general index and as a reference key to the data base. It is concise enough to serve as an overview for an individual who wishes to determine what data is present, and it is indispensable to the on-line user who requires a guide to the mnemonics and abbreviations. GRA

N77-33602*# Duke Univ., Durham, N.C. Dept. of Electrical Engineering.
USER'S MANUAL: COMPUTER-AIDED DESIGN PROGRAMS FOR INDUCTOR-ENERGY-STORAGE dc-TO-dc ELECTRONIC POWER CONVERTERS
Stephen Huffman 30 Jun. 1977 157 p refs

(Contract NAS5-22475)
(NASA-CR-152612; S-02) Avail NTIS HC A08/MF A01 CSCL 10A

Detailed instructions on the use of two computer-aided-design programs for designing the energy storage inductor for single winding and two winding dc to dc converters are provided. Step by step procedures are given to illustrate the formatting of user input data. The procedures are illustrated by eight sample design problems which include the user input and the computer program output. Author

N77-33846/ Los Alamos Scientific Lab., N. Mex.
ACCOUNTING SYSTEMS FOR ENERGY CONSERVATION
R. J. Barrett and M. Becker Nov. 1976 10 p refs
(Contract W-7405-eng-36)
(LA-6569-MS) Avail: NTIS HC A02/MF A01

It was found that existing methods of accounting for energy consumption are not well suited to the analysis of energy conservation programs. A thorough discussion is presented of what the characteristics of an energy conservation data base ought to be. A data base (GADFLY) is suggested, which would be designed for analysis of conservation policies. Using New Mexico as an example, the difference between GADFLY and the Federal Energy Administration's STRAWMAN data base is detailed. ERA

N78-20822*/ IBM Federal Systems Div., Huntsville, Ala.
SYSTEM DESIGN PACKAGE FOR THE SOLAR HEATING AND COOLING CENTRAL DATA PROCESSING SYSTEM
Mar. 1978 350 p Prepared for DOE
(Contract NAS8-32036)
(NASA-CR-150595) Avail: NTIS HC A15/MF A01 CSCL 10A

The central data processing system provides the resources required to assess the performance of solar heating and cooling systems installed at remote sites. These sites consist of residential, commercial, government, and educational types of buildings, and the solar heating and cooling systems can be hot-water, space heating, cooling, and combinations of these. The instrumentation data associated with these systems will vary according to the application and must be collected, processed, and presented in a form which supports continuity of performance evaluation across all applications. Overall software system requirements were established for use in the central integration facility which transforms raw data collected at remote sites into performance evaluation information for assessing the performance of solar heating and cooling systems. Author

N78-21896*/ IBM Federal Systems Div., Huntsville, Ala.
CENTRAL DATA PROCESSING SYSTEM (CDPS) USER'S MANUAL: SOLAR HEATING AND COOLING PROGRAM
Sep. 1976 188 p Prepared for DOE
(Contract NAS8-32036)
(NASA-CR-150580; IBM-7933252) Avail: NTIS HC A09/MF A01 CSCL 10A

The software and data base management system required to assess the performance of solar heating and cooling systems installed at multiple sites is presented. The instrumentation data associated with these systems is collected, processed, and presented in a form which supported continuity of performance evaluation across all applications. The CDPS consisted of three major elements: communication interface computer, central data processing computer, and performance evaluation data base. Users of the performance data base were identified, and procedures for operation, and guidelines for software maintenance were outlined. The manual also defined the output capabilities of the CDPS in support of external users of the system. Author

N78-23672/ Mathematical Sciences Northwest, Inc., Bellevue, Wash.
ENERGY DEMAND FORECASTING MODEL. TECHNICAL APPENDIX. COMPUTER PROGRAM USERS GUIDE AND OPERATIVE MANUAL, DATA BASE USERS GUIDE, AND PACIFIC NORTHWEST ENERGY DATA BASE Final Report
W. Michael McHugh, J. Michael Storie, James W. Lockett, Stephen G. Scott, and Edward A. Holt 1977 370 p Sponsored by Northwest Energy Policy Project, Portland, Oreg.
(PB-276921/4; NEPP-2) Avail NTIS HC A16/MF A01 CSCL 10A

Operating instructions and system documentation for a computerized energy demand forecasting model are presented. The model has the capability to forecast energy demand for four fuel types for the three Northwest states, in five-year steps, from 1980 through the year 2000. The forecasts were further broken down into the residential, commercial, industrial, transportation, and other sectors. The model written in FORTRAN for the CDC 6500 computer, is econometric, correlating over 800 time series. GRA

N78-23929 National Technical Information Service, Springfield, Va.
FLUIDIZED BED COMBUSTION, VOLUME 1. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1977 - Mar. 1978
Diane M. Cavagnaro Mar. 1978 110 p Supersedes NTIS/PS-77/0195 and NTIS/PS-76/0162
(NTIS/PS-78/0196/2; NTIS/PS-77-0195; NTIS/PS-76/0162) Copyright. Avail NTIS HC $28.00/MF $28.00 CSCL 21B

This bibliography of worldwide research reports includes fluidized bed processes and processors for the combustion of oil, coal, and industrial as well as municipal wastes. The citations cover sludge incineration, fluidized bed boilers, and air pollution abatement by fluidized bed combustion. GRA

N78-25819/ Resource Planning Associates, Inc., Washington, D. C.
INSTITUTIONAL APPLICATIONS OF SOLAR TOTAL ENERGY SYSTEMS Quarterly Progress Report
Jul. 1977 177 p refs
(Contract EG-77-C-04-3786)
(ALO/3786-1; QPR-1) Avail: NTIS HC A09/MF A01

The meteorology followed to develop a data base for assessing market potential in the eight institutional subsectors is described. The subsectors are: elementary and high schools, colleges, and universities, hospitals, military installations, public administration buildings, post offices, airports, and prisons. The market characteristics to be studied in detail are defined, and the methodology to be followed in assessing the relative economic performance of representative STE systems is given. ERA

N78-27690/ Brookhaven National Lab., Upton, N. Y.
DATA BANK FOR THE GEOGRAPHICAL ALLOCATION OF FUTURE US ENERGY SUPPLY FACILITIES BY COUNTY
W. A. Sevian and S. R. Bozzo May 1977 32 p refs
(Contract EY-76-C-02-0016)
(BNL-50754) Avail: NTIS HC A03/MF A01

To aid the analysis and evaluation of the biomedical and environmental effects of future energy systems, a county level data bank of future U.S. energy supply facilities is considered. This data file attempts to fulfill a requirement for a county level information source useful in future energy supply and utilization projections, and the generation of closer links between energy resources, their development and use, and a comprehensive set of the effects of energy consumption. The data file format contains such items as fuel type, process type, year of planned availability, production capacity, employment, and state and county of location for each facility; these formats are described in detail. Finally, a system that has been developed incorporating the data base of future energy supply facilities for the analysis of the biomedical and environmental consequences of energy production and consumption is described. ERA

N78-28831/ Sandia Labs., Albuquerque, N. Mex.
MINICOMPUTER BASED DATA ACQUISITION AND ANALYSIS SYSTEMS FOR VERTICAL AXIS WIND TURBINE TESTING
B. Stiefeld and R. Tomlinson 1978 10 p ref Presented at the 24th Intern. Instrumentation Symp., Albuquerque, N. Mex., 1 May 1978

(Contract EY-76-C-04-0789)
(SAND-78-0187C; Conf-780503-4) Avail: NTIS HC A02/MF A01

The computer based data acquisition system and instrumentation used to acquire environmental, structural, and performance data from the VAWT complex are described. An airborne type PCM encoder mounted on the turbine shaft is used to digitize much of the data, particularly the low level strain information from the turbine blades and supporting structure. The data system is an extension of recently completed work on a similar system for a large, 8.8 meter (25 foot) centrifuge facility. Computer software which provides near real time graphic and analytic capabilities is also described. ERA

N78-32564# Department of Energy, Washington, D. C. Div. of Consumption Data Studies.
FEDERAL ENERGY DATA SYSTEM (FEDS): STATISTICAL SUMMARY
Raymond F. Fuller Feb. 1978 891 p ref
(DOE/EIA-0031/2) Avail: NTIS HC A99/MF A01

The Federal Energy Data System (FEDS) has data on annual energy consumption from 1960 through 1975, categorized by fuel, sector, and geographic area. The major fuels considered are coal, natural gas, motor gasoline, jet fuel, distillate, residual, electricity, and hydro and nuclear power. Data on petrochemical feedstocks, other petroleum products and other raw materials are also included. The sectors considered are residential, commercial, industrial, transportation, and electric utilities. The data are at the State level, with census division and national totals included. The FEDS data base also includes selected macroeconomic and demographic data. ERA

N79-10880# Energy and Environmental Analysis, Inc., Arlington, Va.
END USE ENERGY CONSUMPTION DATA BASE: SERIES 1 TABLES
Washington DOE Jun. 1978 219 p refs Prepared in cooperation with Faucett (Jack) Associates, Inc., Chevy Chase, Md., and Ultrasystems, Inc., McLean, Va.
(Contract DOE-CO-03-60412-00; DOE-CO-03-50346-00; DOE-CO-03-60410)
(PB-281817/7; DOE/EIA-0014; DOE/CRN-780106-00003) Avail: NTIS HC A10/MF A01 CSCL 10A

A series of tables are presented which categorize national energy consumption in 1974 by economic sector, by major industries within certain sectors, by end use, by fuel, and by geographic area. For the transportation sector, there is a breakout by mode of transportation. For the residential sector, there are breakouts by type of housing structure and by the income level of the residents. GRA

N79-12888# Chicago Univ., Ill.
INDUSTRIAL INTERNATIONAL DATA BASE: ENERGY ANALYSIS METHODOLOGY. RATIONAL USE OF ENERGY PROGRAM PILOT STUDY Final Report
1978 55 p refs
(Contract EX-76-C-10-3869)
(NATO/CCMS-75) Avail: NTIS HC A04/MF A01

The Industrial International Data Base Project represents an effort to provide information for the responsible development of energy resources and the allocation of energy research and development funds in industry. The Data Base Project and its organizational history are described. The recommendations of the methodology experts' group are reported along with brief justifications. The general outline and discussion of the recommended method of analyzing total energy use are provided. It is directed at industrial managers, government officials, and potential energy analysts who are unfamiliar with the techniques and inherent difficulties of such assessments. Detailed examinations of more technical aspects of the analyses, exhibits that compare total sectoral energy use in selected countries, a list of documents published under the auspices of the Data Base Project, and a list of attendees at the experts' meetings are included. DOE

N79-12808# Bechtel Corp., San Francisco, Calif.
DESIGN OF LOW-COST STRUCTURES FOR PHOTOVOLTAIC ARRAYS. TASK 1: SURVEY OF ARRAY STRUCTURAL CHARACTERISTICS
Feb. 1978 60 p refs
(Contract EY-76-C-04-0789)
(SAND-78-7021) Avail: NTIS HC A04/MF A01

In developing design concepts for low cost photovoltaic arrays structural details and functions, manufacturing capability, installation methods, and the maintenance of operating systems are considered. So much is involved in establishing feasible support concepts that it is important to determine the evolution of existing solar array support designs as presently installed or conceptualized by manufacturers. A data base for solar collector systems using existing sources of information was established. Technical literature was surveyed, and solar industry manufacturers were surveyed by mail and telephone to acquire basic data about their products. Companies that make either thermal or photovoltaic collectors were included in the survey listings and company names continue to be added. The nonsolar industry was contacted as well because of the potential for including their knowledge and experience. Results of the surveys and visits are discussed. DOE

N79-12812# Little (Arthur D.), Inc., Cambridge, Mass.
SOLAR HEATING AND COOLING OF BUILDINGS (SHACOB) COMMERCIALIZATION REPORT. PART B: ANALYSIS OF MARKET DEVELOPMENT, VOLUME 2
May 1978 88 p refs
(HCP/M70066-01/2) Avail: NTIS HC A05/MF A01

The SHACOB Commercialization Model is designed to gauge the impacts of selected federal incentive programs to encourage the development of solar energy equipment for hot water heating, space heating, and space cooling in residential and commercial buildings. The origin of the major economic and technical data base elements used in the model are discussed and trends of these elements are projected over the time frame. The status of the solar industry is reviewed briefly. The results of the SHACOB Model analysis are discussed in the following areas: a comparison of the four major incentive scenarios, the sensitivity of the SHACOB Model to key data assumptions, the impact of single incentives (versus incentive packages), a comparative view of the National Energy Plan (NEP) projections versus the COMP/NEP approach, and a brief investigation of possible phased incentive programs designed to avoid the disruptive effects resulting from the sudden termination of major incentives. DOE

N79-12822# Sandia Labs., Albuquerque, N. Mex.
SOLAR IRRIGATION PROGRAM DATA BASE MANAGEMENT SYSTEM (SIPDBMS)
P. C. Kesstner May 1978 141 p refs
(Contract EX-76-C-04-0789)
(SAND-78-0841) Avail: NTIS HC A07/MF A01

A user's guide to (SIPDBMS) and the data bases available is presented. The code is described in some detail to make code modifications easier. SIPDBMS is operational on the CDC 6600. DOE

N79-14530# Alabama Univ., Huntsville. Environmental and Energy Center.
SOLAR RADIATION DATA SOURCES, APPLICATIONS AND NETWORK DESIGN
Eugene A. Carter, David L. Christensen, and Baker B. Williams Apr. 1978 202 p refs
(Contract EG-77-S-05-5362)
(HCP/T5362-01) Avail: NTIS HC A10/MF A01

A prerequisite to considering solar energy projects is to determine the requirements for information about solar radiation to apply to possible projects. This report offers techniques to help the reader specify requirements in terms of solar radiation data and information currently available, describes the past and present programs to record and present information to be used for most requirements, presents courses of action to help the user meet his needs for information, lists sources of solar radiation data and presents the problems, costs, benefits and responsibilities of programs to acquire additional solar radiation data. Author

N79-23804*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A NORMATIVE PRICE FOR A MANUFACTURED PRODUCT: THE SAMICS METHODOLOGY. VOLUME 1: EXECUTIVE SUMMARY
Robert G. Chamberlain 15 Jan. 1979 18 p refs Prepared for DOE 2 Vol.
(Contract NAS7-100)
(NASA-CR-158502; JPL-PUB-78-98-Vol-1; DOE/JPL-1012-79/5) Avail: NTIS HC A02/MF A01 CSCL 10A

A summary for the Solar Array Manufacturing Industry Costing Standards report contains a discussion of capabilities and limitations, a non-technical overview of the methodology, and a description of the input data which must be collected. It also describes the activities that were and are being taken to ensure validity of the results and contains an up-to-date bibliography of related documents. Author

N79-25111*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
DSN ENERGY DATA BASE PRELIMINARY DESIGN
E. R. Cole, L. O. Herrera, and D. M. Lascu *In its* The Deep Space Network 15 Jun. 1979 p 167-181 refs

Avail: NTIS HC A11/MF A01 CSCL 10B

The design and implementation of a computerized data base created to support the DSN Energy Conservation Project with data relating to energy use at Goldstone Deep Space Communications Complex are described. The results of development work to date, are presented along with work currently in progress or in the planning stage. M.M.M.

N79-25624# Austrian Solar and Space Agency, Vienna.
METEOROLOGICAL MEASUREMENT DATA FOR SOLAR ENERGY UTILIZATION [METEOROLOGIE MESSDATEN FUER DIE NUTZUNG DER SONNENENERGIE]
G. Braeunlich, M. Bruck, E. Panzhauser, F. Neuwirth, and G. Skoda (Vienna Univ.) Mar. 1977 108 p refs In GERMAN Sponsored by Bundesmin. fuer Wiss. U. Forsch. Prepared in cooperation with Zentralanstalt fuer Meteorol. U. Geodyn., Vienna
(ASSA-FA-5) Avail: NTIS HC A06/MF A01

Meteorological parameters relevent to solar energy utilization are defined. Topics discussed include an empirical procedure for approximation of total radiation, an inventory of available measurement data, recommendations for an expanded program of measurement, and standardized data acquisition and data processing. It is concluded that relevant data are available at only a few observation points and the available data are not fully evaluated with respect to requirements oof solar energy users. Appropriate measures are proposed to reduce the data deficit. The meteorological parameters necessary for a precise determination of total radiation are listed. Time series analysis of radiation and meteorological data for Central Austria and computer storage of these data is recommended in support of a program simulating performance of a solar energy system. J.M.S.

N79-26470*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
HANDBOOK OF DATA ON SELECTED ENGINE COMPONENTS FOR SOLAR THERMAL APPLICATIONS
Jun. 1979 240 p refs Prepared for DOE
(Contract EX-76-A-29-1060)
(NASA-TM-79027; E-9822; DOE/NASA/1060-78/1) Avail: NTIS HC A11/MF A01 CSCL 10B

A data base on developed and commercially available power conversion system components for Rankine and Brayton cycle engines, which have potential application to solar thermal power-generating systems is presented. The status of the Stirling engine is discussed. S.E.S.

N79-27002# Brookhaven National Lab., Upton, N. Y.
COMPREHENSIVE AREAL MODEL OF RESIDENTIAL HEATING DEMANDS
R. G. Tessmer, Jr. 1978 8 p refs Presented at the 2d Lawrence Symp. on Systems and Decision Sci., San Francisco, 3-4 Oct. 1978
(Contract EY-76-C-02-0016)
(BNL-24896; Conf-7810136-1) Avail: NTIS HC A02/MF A01

Data sources and methodology for modeling annual residential heating demands are described. A small areal basis is chosen, census tract or minor civil divison, to permit estimation of demand densities and economic evaluation of community district heating systems. The demand model is specified for the entire nation in order to provide general applicability and to permit validation with other published fuel consumption estimates for 1970. DOE

N79-29629# Department of Energy, Washington, D. C. Office of Solar, Geothermal, Electric and Storage Systems.
INSOLATION RESOURCE ASSESSMENT PROGRAM PLAN Fiscal Years, 1979 - 1981
Jan. 1979 48 p refs
(DOE/ET-0082) Avail: NTIS HC A03/MF A01

The collection, processing, and archiving of geophysical data for solar energy application is planned. The principal solar parameters to be measured are global, direct, diffuse, and total radiation on an inclined surface. The measurement of the spectral distribution of solar radiation is also important to the development of several technologies. Completed, current, and planned projects to improved solar data collection methods and procedures and to refine solar radiation forecasting capabilities are presented. DOE

N79-30010# Thermo Electron Corp., Waltham, Mass.
ENERGY CONSERVATION OPPORTUNITIES IN COMMERCIAL APPLIANCES Final Report
J. R. Hurley Dec. 1978 281 p refs
(Contract W-7405-eng-26)
(ORNL/Sub-7261/1) Avail: NTIS HC A13/MF A01

A data base of energy consuming applicances in the commercial sector was established which identifies and rates the most promising development opportunities that would save significant amounts of energy on a national level. A detailed national inventory of 45 major appliances and their energy consumption was established for the year 1975. Thirty-four potential appliance improvements were identified, evaluated, and ranked. The major energy consuming appliances in the following functional use categories were identified, space heating and cooling, water heating, refrigeration, cooking, and lighting. The equipment in these categories was estimated to consume 87% of the total energy used in the commercial sector, with the remaining 13% consumed by equipment such as computers, business machines, laundry equipment, dishwashing, and other food service equipment. DOE

N79-30019# California Univ., Berkeley. Lawrence Berkeley Lab.
ENERGY CONSERVATION: POLICY ISSUES AND END-USE SCENARIOS OF SAVINGS POTENTIAL. PART 6. END-USE ENERGY CONSERVATION DATA BASE AND SCENARIOS
Sep. 1978 398 p refs
(Contract W-7405-eng-48)
(LBL-7896-Pt-6) Avail: NTIS HC A17/MF A01

End-use energy conservation scenarios discussed show the combined effect on energy consumption of implementing a number of conservation measures. The scenarios serve two overall purposes. First, they provide a contrast of a series of nonconservation cases based on assumption of growth rate and appliance saturation with conservation cases on similar assumptions. Second, they provide detailed data and documentation for the savings potential for each conservation measure, the stock affected, and the calculation of total energy savings. Included are conservation measures of both a behavioral nature and technological nature. Quantitative estimates of energy consumption and conservation potential in the major residential and commercial end uses, transportation modes, and industrial subsectors made. For each measure and for the total scenario a base case and a conservation case were computed. DOE

N79-31790# Department of Energy, Washington, D. C. Energy Information Administration.
END-USE ENERGY-CONSUMPTION DATA BASE. VERSION 10: USER'S MANUAL
M. Maloney Feb. 1979 94 p refs
(DOE/EIA-0175) Avail: NTIS HC A05/MF A01

The end use energy consumption data base contains estimates of United States energy consumption categorized by fuel type, section of the economy, end use, and geographic area. Eight sectors are considered: agriculture, mining, construction, manufacturing, transportation, commercial, household, and electric utilities. Consumption estimates are at the national, census-division, and state levels, except for the household and commercial sectors, which are only at the national and census-division levels. The version of the data base described by this manual (version 110) contains consumption estimates for 1967, 1971, and 1974; the commercial sector estimates are for 1974 only. Future versions will contain estimates for 1975. The data base exists in two forms: as a sequential file on tape and as a random access file on computer. The random access file must be accessed by use of the data base management system. DOE

N79-32712# Sandia Labs., Albuquerque, N. Mex.
SOLAR RADIATION MODEL VALIDATION
I. J. Hall, R. R. Prairie, H. E. Anderson, and E. C. Boes [1979] 5 p refs Presented at Intern. Solar Energy Soc. Meeting, Atlanta, 28 May 1979
(Contract EY-76-C-04-0789)
(SAND-79-1120C; Conf-790541) Avail: NTIS HC A02/MF A01

The accuracy of three solar radiation models was investigated. The data base used to assess the accuracy of these models was obtained from several sites in the new U.S. National Weather Service Network. Each of the models was used to estimate the solar radiation and the modeled radiation values were compared with observed radiation values. The most important results of these comparisons for the clear solar noon model and the total horizontal regression model are included here. DOE

N80-11570*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SAMICS: INPUT DATA PREPARATION
R. G. Chamberlain and R. W. Aster 1 Mar. 1979 35 p ref Revised
(NASA-CR-162421; DOE/JPL-1012-22-Rev-A) Avail: NTIS HC A03/MF A01 CSCL 10A

The Solar Array Manufacturing Industry Costing Standards (SAMICS) provide standard formats, data, assumptions, and procedures for estimating the price that a manufacturer would have to charge for the product of a specified manufacturing process sequence. A line-by-line explanation is given of those standard formats which describe the economically important characteristics of the manufacturing processes and the technological structure of the companies and the industry. This revision provides an updated presentation of Format A Process Description, consistent with the October 1978 version of that form. A checklist of items which should be entered on Format A as direct expenses is included. DOE

N80-11587# Argonne National Lab., Ill.
WORLD ENERGY DATA SYSTEM (WENDS)
W. E. Lereau 1979 45 p refs Presented at the Spring Meeting of the Assoc. of System 2000 Users for Tech. Exchange (ASTUTE), Austin, Tex., 3 Apr. 1979
(Contract W-31-109-eng-38)
(CONF-790461-2) Avail: NTIS HC A03/MF A01

The storage of preformatted textual information in a completely user oriented data base, the World Energy Data System, is discussed. The system allows qualified users online access to nonclassified management level data on worldwide energy technology and research and development activities. WENDS transmits up-to-date information on foreign energy technology and research and development programs to DOE program divisions, the Congress, and other U.S. Government officials going abroad. The WENDS concept is described and the method storing and retrieving the textual information is discussed. DOE

N80-11596# Midwest Research Inst., Golden, Colo.
PROCEEDINGS: SOLAR THERMAL POWER USER REVIEW PANEL MEETING
Mar. 1979 33 p Conf. held 1-2 Mar. 1979
(Contract EG-77-C-01-4042)
(SERI/TP-69-221) Avail: NTIS HC A03/MF A01

Solar Energy Research Institute presentations on (1) the R&D mission in Solar Thermal technology; (2) TID management and organization; and (3) target audience characteristics are reviewed. Synopses of discussions on target audience needs are included. DOE

N80-11612# Transportation and Economic Research Associates, Inc., Arlington, Va.
DISAGGREGATING PIES FUEL FORECASTS, VALIDATING PIES TRANSPORTATION MODEL DATA BASE, AND OTHER TECHNICAL SERVICES
15 Sep. 1978 84 p
(Contract EC-77-C-01-8578)
(TID-29000) Avail: NTIS HC A05/MF A01

Three research tasks concerned with modifications and/or alterations to the PIES (Project Independence Evaluation System) and one auxiliary research task are reported. The first task, a modification to the transportation data base for petroleum refining regions, was necessitated by a proposed change of the present seven refining districts to ten refining districts. Five of the Standard Tables on transportation costs required changes. Tariffs and route descriptions are given in interregional pipeline rates for crude oil and petroleum products. Pipeline tariffs and tanker costs for distribution of Alaskan oil to PIES refining regions are tabulated. In the second task the structure of the coal transportation submodel in PIES was changed by building a simplified transshipment network which makes it possible to easily track coal from the mine to the point of use. The third task is a brief description of natural gas rates and rate making practices in the U.S. The fourth task analyzes differences in actual wholesale prices in various other locations in a region (as opposed to the PIES centroid) with respect to the differences in transportation costs. DOE

N80-12900# California Univ., Berkeley. Lawrence Berkeley Lab.
ANALYSIS OF THE CALIFORNIA SOLAR RESOURCE, VOLUME 2 Final Report
P. Berdahl, D. F. Grether, M. Martin, and M. Wahlig Nov. 1978 90 p refs
(Contract W-7405-eng-48)
(LBL-7860-Vol-2) Avail: NTIS HC A05/MF A01

In order to assess the requirements for solar design data, several different paths were followed. The existing literature was consulted, analytical work was carried out within the project to determine the sensitivity of system design to errors in the solar data, and extensive contacts were made with potential users of solar data. Existing solar design techniques were evaluated in order to determine the types and quality of data needed. The determination of future solar data requirements for California was made on the basis of a regionalization of the state into solar zones, a familiarity with existing and proposed high-quality solar data networks, and knowledge of past data collection efforts. Recommendations for action by the state are presented. These recommendations are made to assure that adequate measures are taken now to meet solar data needs of the future. DOE

N80-13707# Iowa State Univ. of Science and Technology, Ames.
ENERGY CONSERVATION VIA HEAT TRANSFER ENHANCEMENT Quarterly Progress Report, 1 Oct. - 31 Dec. 1978
A. E. Bergles, G. H. Junkhan, and R. L. Webb Mar. 1979 21 p refs
(Contract ET-78-S-02-4649)
(COO-4649-4) Avail: NTIS HC A02/MF A01

Research on energy conservation via heat transfer enhancement is summarized. Computerized retrieval files on technical literature, patents, and manufacturers were developed. DOE

N80-17571# Solar Environmental Engineering Co., Inc., Fort Collins, Colo.
CONTINUING REGIONAL SOLAR ENERGY INFORMATION MINI-CENTER ACTIVITIES AND UPDATING THE SOLCOST PROGRAM Quarterly Report, Nov. 1978 - Jan. 1979
L. J. Lantz Jan. 1979 31 p
(Contract EG-77-C-02-4643)
(COO-4643-T1) Avail: NTIS HC A03/MF A01

Contents: interactive SOLCOST interface; energy conversion - solar system optimization; detailed duct sizing; extension of the SOLCOST data base; portable FORTRAN version; automatic collector parameter subroutine; the SOLAR INDEX; and the operation of the SOLCOST Mini-Center. DOE

N80-20823*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PANEL DISCUSSION: BRIDGING THE GAP TECHNOLOGY DEVELOPING FLIGHT HARDWARE
Floyd E. Ford *In its* The 1979 Goddard Space Flight Center Battery Workshop Apr. 1980 p 29-46

Avail: NTIS HC A22/MF A01 CSCL 10C

The development of an engineering data base for aerospace batteries is discussed. R.E.S.

N80-21898# EcoSystems, Inc., McLean, Va.
POTENTIAL FOR SOLAR/CONSERVATION TECHNOLOGIES IN THE STATE OF WASHINGTON
David Baylon, J. Brautigam, H. Reichmuth, B. Boulter, S. Gross, A. Stewart, and S. Worthman 4 Apr. 1979 70 p refs
(Contract EG-77-G-01-4099)
(WAOENG-79-3) Avail: NTIS HC A04/MF A01

A data base for Washington State energy consumption by fuel type is presented and divided into energy end use temperatures and types. Solar/conservation technologies are classed according to their immediacy as options for use, cost effectiveness, current availability, and compatibility with intended uses. The effect of presently feasible solar conservation technologies on Washington State energy consumption, if fully deployed, amounts to approximately 15 percent of the total 1974 energy use. Agricultural, industrial, commercial and residential end uses are also discussed. DOE

N80-24788*# Science Applications, Inc., McLean, Va.
SOLAR THERMAL PLANT IMPACT ANALYSIS AND REQUIREMENTS DEFINITION
Yudi P. Gupta *In* JPL Proc. of the First Semiann. Distributed Receiver Program Rev. 15 May 1980 p 197-209

(Contract JPL-955238)
Avail: NTIS HC A11/MF A01 CSCL 10B

Progress on a continuing study comprising of ten tasks directed at defining impact and requirements for solar thermal power systems (SPS), 1 to 10 MWe each in capacity, installed during 1985 through year 2000 in a utility or a nonutility load in the United States is summarized. The point focus distributed receiver (PFDR) solar power systems are emphasized. Tasks 1 through 4, completed to date, include the development of a comprehensive data base on SPS configurations, their performance, cost, availability, and potential applications; user loads, regional characteristics, and an analytic methodology that incorporates the generally accepted utility financial planning methods and several unique modifications to treat the significant and specific characteristics of solar power systems deployed in either central or distributed power generation modes, are discussed. E.D.K.

N80-24848# United Engineers and Constructors, Inc., Philadelphia, Pa.
ENERGY ECONOMIC DATA BASE (EEDB) PROGRAM: PHASE 1: INITIAL UPDATE Final Report
Dec. 1979 210 p refs
(Contract EN-78-C-02-4954)
(COO-4954-1-Vol-3) Avail: NTIS HC A10/MF A01

Volume 1 describes the EEDB and presents some pertinent update material. The initial appendices make up Volume 2 in which descriptions of the Standard Hypothetical Middletown Sites for nuclear power plants and coal-fired power plants are presented. Additional data in appendices in Volume 2 include information on fuel-cycle work; inflation-free fixed charge rates; capital cost update procedure; and nuclear steam supply system. This Volume 3, contains additional appendices entitled: Practical Target Economics for the Liquid Metal Fast Breeder Reactor Nuclear Power Generating Station; Air-Quality Impact Analysis for determination of the Acceptability of Qualified High and Low-sulfur Coal-fired Facility Designs for the Hypothetical Middletown Site; Synthetic Power Plant Fuels by the Solvent Refined Coal Process; Inflation Free Fuel Cycle Costs for Throwaway and Recycle Cases; Inflated (6%) Fuel Cycle cost for Throwaway and Recycle cases; Inflated (7%) Fuel cost for Throwaway and Recycle Cases; Inflated (8%) Fuel Cycle Costs for Throwaway and Recycle Cases; Fuel Costing Methodology; and Bred-Fuel Scenarios. DOE

N80-24088# Oak Ridge National Lab., Tenn. Energy Div.
ENERGY AVAILABILITIES FOR STATE AND LOCAL DEVELOPMENT: 1975 DATA VOLUME
J. B. Mills, P. L. Rice, and D. P. Vogt Jan. 1980 285 p
(Contract W-7405-eng-26)
(ORNL/TM-6951) Avail: NTIS HC A13/MF A01

The supply, demand, and net imports of seven fuel types of four final consuming sectors for Bureau of Economic Analysis Areas (BEAs), states, census regions, and the nation in 1975 are presented. The data are formatted to present regional energy availability from primary extraction as well as from regional transformation processes. Extensive tables depict energy balances between availability and use for each specific fuel. A consistent base of historic and projected energy information is presented within a standard format. Such a framework should aid regional policy makers in their consideration of regional-growth issues that may be influenced by the regional energy system. For analysis of specific regions, however, this basic data should be supplemented by additional information which only the local policy analyst can bring to bear in his assessment of the energy conditions that characterize his region. DOE

N80-29880*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
URBAN SOLAR PHOTOVOLTAICS POTENTIAL: AN INVENTORY AND MODELLING STUDY APPLIED TO THE SAN FERNANDO VALLEY REGION OF LOS ANGELES
G. L. Angelici, N. A. Bryant, R. K. Fretz, and S. Z. Friedman 15 Aug. 1980 47 p refs
(Contract NAS7-100)
(NASA-CR-163436; JPL-PUB-80-43) Avail: NTIS HC A03/MF A01 CSCL 10A

Procedures for analyzing the potential of solar photovoltaic collectors to meet energy requirements in a metropolitan region are described and a modeling effort is applied to the San Fernando Valley region of Los Angeles. The procedure involves a series of steps designed to produce maps and tabulations revealing the amount of rooftop area available for establishing solar collectors and the proportion of energy requirement that could be potentially supplied by solar photovoltaics within each of the 533 mainline feeder service areas in the study area. For the sixty five square mile study area, the results showed that, with half the available flat and south facing roofs used and assuming the availability of energy storage, 52.7 percent of the actual kWh energy requirements could have been met in 1978 using photovoltaic collectors. Hourly, daily, weekly, and monthly fluctuations in potential supply and actual loads and recommendations of avenues for further research are discussed. Some further potential applications of the modeling technique are suggested. Author

N80-29891# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
SCREENING METHOD FOR WIND ENERGY CONVERSION SYSTEMS
Robert D. McConnell Mar. 1980 6 p refs Presented at Am.

Sect. of the Intern. Solar Energy Soc. Conf., Phoenix, Ariz., 2-6 Jun. 1980
(Contract EG-77-C-01-4042)
(SERI/TP-731-649; CONF-800604-19) Avail: NTIS HC A02/MF A01

A screening method is presented for evaluating wind energy conversion systems (WECS) logically and consistently. It is a set of procedures supported by a data base for large conventional WECS. The procedures are flexible enough to accommodate concepts lacking cost and engineering detail, as is the case with many innovative wind energy conversion systems (IWECS). The method uses both value indicators and simplified cost estimating procedures. Value indicators are selected ratios of engineering parameters involving energy, mass, area, and power. Cost mass ratios and cost estimating relationships were determined from the conventional WECS data base to estimate or verify installation cost estimates for IWECS. These value indicators and cost estimating procedures are shown for conventional WECS. An application of the method to a tracked vehicle airfoil concept is presented. DOE

N80-31882*# Westinghouse Research and Development Center, Pittsburgh, Pa.
CELL MODULE AND FUEL CONDITIONER Quarterly Report, Apr. - Jun. 1980
D. Q. Hoover, Jr. Jul. 1980 75 p
(Contracts DEN3-161; DE-AI 03-79ET-11272)
(NASA-CR-159888; DOE/NASA/0161-4;
Rept-80-9E8-MARED-R3; QR-3) Avail: NTIS HC A04/MF A01 CSCL 10A

The computer code for the detailed analytical model of the MK-2 stacks is described. An ERC proprietary matrix is incorporated in the stacks. The mechanical behavior of the stack during thermal cycles under compression was determined. A 5 cell stack of the MK-2 design was fabricated and tested. Designs for the next three stacks were selected and component fabrication initiated. A 3 cell stack which verified the use of wet assembly and a new acid fill procedure were fabricated and tested. Components for the 2 kW test facility were received or fabricated and construction of the facility is underway. The definition of fuel and water is used in a study of the fuel conditioning subsystem. Kinetic data on several catalysts, both crushed and pellets, was obtained in the differential reactor. A preliminary definition of the equipment requirements for treating tap and recovered water was developed. S.J.

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

A76-21448 # **New method for modeling the system 'economy-hydrosphere' (Novii metod modeliuvannia sistemi 'ekonomika-gidrosfera').** M. T. Meleshkin and L. S. Zagoch'ka. *Akademiia Nauk Ukrains'koi RSR, Visnik*, vol. 39, Nov. 1975, p. 40-54. 20 refs. In Ukrainian.

The paper discusses the problem of constructing a comprehensive software apparatus for modeling the hydrosphere and man's exploitation of it in the economical process, for the purpose of making predictions regarding the long-term effects of various disturbances of the hydrosphere. Many such models exist for a number of individual aspects which do not take the whole problem into account. A new language would have to be created that would unify existing methods of describing various phenomena and processes. The present work sketches an approach to this problem with the aid of a semiotic type language of situation control. The suitability of situation control language for describing the environment is investigated, and principles of organizing a data base for the system 'economy-hydrosphere' are set forth. P.T.H.

A76-25882 **Network design considerations for the global environmental monitoring system /GEMS/ of the United Nations.** R. Citron (Smithsonian Institution, Cambridge, Mass.). In: International Conference on Environmental Sensing and Assessment, Las Vegas, Nev., September 14-19, 1975, Proceedings. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 1 3-6 to 6 3-6. 22 refs.

A76-25889 **The application of pattern recognition techniques to the characterization of atmospheric aerosols.** S. P. Perone, M. Pichler, P. Gaarenstroom (Purdue University, West Lafayette, Ind.), and J. L. Moyers (Arizona, University, Tucson, Ariz.). In: International Conference on Environmental Sensing and Assessment, Las Vegas, Nev., September 14-19, 1975, Proceedings. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 1 5-4 to 4 5-4. 6 refs. Research supported by the Electric Power Research Institute; NSF Grant No. MPS-74-12762; Contract No. N00014-67-A-0226-0021.

Measurements were made of the amounts of 24 components in 24-hour samples of atmospheric particulates collected over a 12-month period in the greater Tucson, Arizona, area. Techniques of pattern recognition were used to examine the data base, which also included meteorological information collected daily over the same period of time. Clustering methods grouped similar components together. Principal component analysis showed that most of the variance was contained in only a few dimensions. (Author)

A76-25893 **Management of groundwater quality data.** N. F. Hampton (Commonwealth Associates, Inc., Jackson, Mich.). In: International Conference on Environmental Sensing and Assessment, Las Vegas, Nev., September 14-19, 1975, Proceedings. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 1 9-5 to 5 9-5. 5 refs.

The growing concern for subsurface water resources will surely be accompanied by an expanding groundwater data base, which is already quite large. This paper is intended to point the way toward the efficient management of this data base, which will assure that pertinent information is available when and where it is needed. The requirements of groundwater data management are described, and some of the available capabilities which may serve to satisfy these requirements are surveyed. (Author)

A76-25954 **Data management - Key to environmental quality assessment.** T. S. Austin (NOAA, Environmental Data Service, Washington, D.C.). In: International Conference on Environmental Sensing and Assessment, Las Vegas, Nev., September 14-19, 1975, Proceedings. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 1 25-1 to 4 25-1.

Data and data flow must be primary concerns of environmental quality monitoring, assessment, and warning systems. The scope and complexity of programs such as the UNESCO/IOC GIPME (Global Investigation of Pollution of the Marine Environment) demand a strong, structured, and thoroughly integrated data management system if such massive efforts are to be fruitful. This paper describes a still-evolving generic concept for such a system. The concept incorporates knowledge and experience gained in large-scale, interdisciplinary data collection and interpretation programs such as BOMEX (Barbados Oceanographic and Meteorological Experiment), IFYGL (the International Field Year for the Great Lakes), and GATE (the Atlantic Tropical Experiment of the ICSU Global Atmospheric Research Program); a prototype data management system developed for U.S. programs in the IDOE (International Decade of Ocean Exploration); and the development of a NOAA environmental quality monitoring plan for proposed oil and gas activities on the U.S. Continental Shelf. (Author)

A76-25958 **EPA's Aerometric and Emissions Reporting System /AEROS/ - An approach to air quality data management.** J. C. Bosch, Jr. (U.S. Environmental Protection Agency, Research

Triangle Park, N.C.). In: International Conference on Environmental Sensing and Assessment, Las Vegas, Nev., September 14-19, 1975, Proceedings. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 1 25-3 to 6 25-3. 5 refs.

The United States Environmental Protection Agency's comprehensive air pollution information system - the Aerometric and Emissions Reporting System (AEROS) - is an invaluable tool for effectively managing the national air pollution control program. Each of the two major subsystems of AEROS, the National Emissions Data System (NEDS) and Storage and Retrieval of Aerometric Data (SAROAD), is dealt with in detail in this paper. SAROAD is the established Federal data system for storing ambient air quality data from the air monitoring activities of State, local, and Federal agencies. NEDS, on the other hand, contains annual emissions and operating characteristics of individual emitters throughout the nation. NEDS and SAROAD data are regularly submitted to EPA by all States in accordance with mandatory Federal reporting requirements. The management, structure, and content of the EPA air data systems are described in this paper and procedures for access by the public are discussed in detail. (Author)

A78-27795 # **An analysis of the EPNL/NEF airport noise rating procedure and data base.** S. R. Lane (Engineering-Science, Inc., Arcadia, Calif.). In: Transpo L.A.: Economic leverage for tomorrow; Proceedings of the Fourth Annual Symposium, Los Angeles, Calif., November 12, 1975. North Hollywood, Calif., Western Periodicals Co., 1975, p. 260-275. 58 refs.

Recent measurements of noise levels from commercial jet aircraft in landing approach paths indicate that the standard EPNL data used by FAA and other agencies understate the noise levels and noise impact. Also, the current EPNL calculation procedures contain factors which result in noise values 3 EPNdB less than values obtained starting with the same basic noise signals and using the 1967 EPNL procedure. EPNL and Noise Exposure Forecast (NEF) values are ambiguous in meaning, provide only a relative comparison basis and do not indicate the absolute magnitude of noise intensities and the effects of noise on people. (Author)

A77-15738 **Energy and environmental impacts of materials alternatives - An assessment of quantitative understanding.** A. H. Purcell (George Washington University, Washington, D.C.) and F. L. Smith (U.S. Environmental Protection Agency, Washington, D.C.). *Resource Recovery and Conservation*, vol. 2, Dec. 1976, p. 93-102. 39 refs.

The literature was reviewed to determine which materials may require the least energy for manufacture and use, which may have the least detrimental effect on the environment, and what effect recycling may have on both factors. There is substantial agreement as to the benefits of recycling on environmental quality and conservation, although, there are some important variations in the attempts to quantify the benefits. There is less agreement as to the relative energy consumption and effect on the environment of using materials. This is due chiefly to the substantial number of variables that enter into the evaluations as well as the difficulty in weighting their relative effects. The development of environmental profile analysis - in which subimpacts are weighted before being combined into aggregate impact measurements - appears to be a promising approach to making the analysis of energy and environmental factors more meaningful. (Author)

A78-48084 **Comment on a stack downwash prediction formula.** J. Halitsky. *Atmospheric Environment*, vol. 12, no. 6-7, 1978, p. 1575, 1576.

A data base is presented for a stack plume downwash prediction formula. It is noted that if downwash represents the descent of the entire plume, the formula is applicable to the plume centerline. The data published by Sherlock and Stalker (1941) however, refer only to the downwash displacement of the lower plume boundary. Their data has been redrawn to indicate the dependence of lower boundary elevation on the emission velocity ratio. Two cases are identified for which a small depression of the plume centerline causes a large increase in receptor concentration: the impingement of a plume from an isolated stack on an elevated receptor, and release just above a building cavity. S.C.S.

A79-14747 **Atmospheric dispersion and transport within coastal regions. II - Tracer study of industrial emissions in the California Delta Region.** B. K. Lamb, F. H. Shair (California Institute of Technology, Pasadena, Calif.), and T. B. Smith (Meteorology Research, Inc., Altadena, Calif.). *Atmospheric Environment*, vol. 12, no. 11, 1978, p. 2101-2118. 34 refs. Research supported by the California State Air Resources Board.

A79-27298 **QUAL II simulation analysis for treating acid mine drainage problems in the Monongahela River Basin.** T. E. Holland (Hershey Chocolate Co., Hershey, Pa.), D. L. Gochenour, Jr., and A. W. Pappano (West Virginia University, Morgantown, W. Va.). In: Winter Simulation Conference, Miami Beach, Fla., December 4-6, 1978, Proceedings. Volume 2. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1978, p. 649-656. 5 refs.

The paper describes QUAL II, a simulation program with the capacity for both dynamic and steady-state simulation of many parameters involved in the description of river flows, applied to the evaluation of the secondary effects on a river system due to the treatment of acid mine drainage. The data base is large, containing information on hydraulics and wasteload inputs for over 475 miles of rivers and streams of the Monongahela River Basin. P.T.H.

A79-43384 **The effect of revised dispersion parameters on concentration estimates.** R. F. Lee, J. A. Tikvart (U.S. Environmental Protection Agency, Monitoring and Data Analysis Div., Research Triangle Park, N.C.), J. L. Dicke, and R. W. Fisher. In: Symposium on Turbulence, Diffusion, and Air Pollution, 4th, Reno, Nev., January 15-18, 1979, Preprints. Boston, Mass., American Meteorological Society, 1978, p. 70-74. 13 refs.

The effect of revised dispersion parameters obtained from a scheme proposed by Irwin (1978) on estimates of pollutant concentrations is investigated. The Single Source Model (EPA, 1977) was applied to a meteorological data base for Pittsburgh, Atlanta, and Phoenix in its standard form using the Pasquill-Gifford dispersion parameters, and with the generalized scheme suggested by Irwin to determine the sensitivity of the model to the Irwin dispersion parameters. Results indicate that for taller stacks the proposed dispersion parameters yield increased 24-hour concentrations, whereas the one-hour concentrations are decreased with respect to those obtained with the Pasquill-Gifford parameters. Qualitatively, this indicates that the theoretical results should correspond more closely to measured data. However, a comparison of model estimates using the two sets of dispersion parameters with ambient 24-hour SO2 data for the Muskingum River Power Plant in Ohio fails to show better agreement with the revised parameters. Both sets of dispersion parameters gave concentrations much lower than those observed below the 90th percentile. With the proposed dispersion parameters, the maximum 24-hour concentrations result from persistent winds for Stability Classes D, C, and sometimes B, but not for Stability Class A. C.K.D.

A79-43387 **The formulation and application of a source finding algorithm.** R. J. Yamartino and D. J. Lamich (Argonne National Laboratory, Argonne, Ill.). In: Symposium on Turbulence, Diffusion, and Air Pollution, 4th, Reno, Nev., January 15-18, 1979, Preprints. Boston, Mass., American Meteorological Society, 1978, p. 84-88. 6 refs. USAF-FAA-supported research.

A technique for relating aerometric data obtained from a monitoring network under a variety of meteorological conditions to the spatial distribution and strengths of emission sources is presented. The technique makes use of existing air quality dispersion algorithms. Either exact or approximate methods can be used to determine the effective emission density map. The source resolving capabilities of the exact and approximate methods are compared for a body of CO data from a monitoring network. It was found that the exact method adequately identified source locations and strengths, while approximate solutions located only the most significant source. C.K.D.

A80-27614 **Comparison of predicted and measured concentrations for 58 alternative models of plume transport in complex terrain.** H. M. Ellis, P. C. Liu (Enviroplan, Inc., West Orange, N.J.), and C. Tunyon (Ohio Edison Co., Akron, Ohio). *(Air Pollution Control Association, Annual Meeting, 72nd, Cincinnati, Ohio, June 24-28, 1979, Paper 79-15.4.) Air Pollution Control Association, Journal*, vol. 30, June 1980, p. 670-675. 15 refs.

The purpose of this study was to evaluate alternative prediction models for the SO2 concentrations produced in the vicinity of the Ohio Edison Company Sammis Power Plant. The plant is situated in the northeastern portion of the Ohio River Valley in complex terrain. Comparisons of the 16 highest predicted and measured short-term SO2 concentrations were conducted for a one year period for 58 alternative models. Several models were found to predict reasonably accurately the 16 highest measured 24-hour SO2 concentrations. Each of these models requires an upward adjustment in the plume centerline location as the plume is transported downwind in rising terrain. These same models overpredict by substantial margins the 15 highest measured 3-hour SO2 concentrations. Improvements in emissions inventory data and improvements in the prediction models used are believed necessary to increase prediction accuracy further. (Author)

N75-14204 Environmental Protection Agency, Washington, D.C. Meteorology Lab.

A COMMON DATA BASE FOR AIR QUALITY MODELING
R. E. Ruff *In* **NATO Comm. on the Challenges of Mod. Soc. Proc. of the 5th Meeting of the Expert Panel on Air Pollution Modeling Aug. 1974 5 p**

The development of a data bank for test and comparison of air quality models is proposed. The data bank would reside on a universally compatible magnetic tape and consist of a test data set of about 30 days, consisting of one-hour averages for wind speed and direction, atmospheric stability, pollutant concentrations, and emission inventory estimates. It is stated that the Regional Air Pollution Studies (RAPS) would be the best source available for this information. Various reasons in favor of establishing such a data base and the type of information which it should contain are presented. Author

N75-32037# IBM Federal Systems Div., Gaithersburg, Md.

COMPREHENSIVE DATA HANDLING SYSTEM, EMISSIONS INVENTORY/PERMITS AND REGISTRATION SUBSYSTEM (EIS/P AND R) PROGRAM: DOCUMENTATION AND USERS GUIDE Final Report, Aug. 1972 - Feb. 1975
Feb. 1975 421 p
(Contract EPA-68-02-0638)
(PB-242161/8: EPA-450/3-74-045-a) Avail: NTIS HC $10.50 CSCL 13B

The Emissions Inventory/Permits and Registration Subsystem provides air pollution control agencies with the capability to create and maintain their own emission inventory and permit or registration data base and to retrieve data and generate reports from that data base. A users guide is provided with each program, input requirements, field descriptions, etc. The system has an extremely powerful retrieval capability which allows the user to retrieve on practically and data field in the master file. The system also allows the user to generate his semiannual quarterly report with a minimum of effort. GRA

N76-13046# FEDCO-Environmental Specialists, Inc., Cincinnati, Ohio.

ESTABLISHMENT OF A NON-EPA USER SYSTEM FOR STATE IMPLEMENTATION PLANS Final Report
Jan. 1975 75 p
(Contract DI-68-02-1001)
(PB-243633/5: EPA-450/3-75-048) Avail: NTIS HC $4.50 CSCL 13B

A survey was conducted among selected state air pollution control agencies to determine current practices and projected needs related to accessing U.S. Environmental Protection Agency data bases. Alternative methods for allowing non-EPA users to use the data bases were introduced. A preliminary cost survey was conducted for a projected method for allowing state agencies to have direct access to these bases on air quality measurements and air contaminant emissions. This is a preliminary analysis of expected costs for operating the Comprehensive Data Handling System on a centralized computer accessed through remote terminals located in state air pollution control agency offices. GRA

N76-13049# Miami Univ., Fla. Sea Grant Institutional Program.

A BIBLIOGRAPHY OF BISCAYNE BAY, FLORIDA MONITORING AND RESEARCH PROGRAMS
Peter C. Rosendahl May 1975 85 p refs
(Grant NOAA-04-5-158-14)
(COM-75-11043/7; Sea-Grant-SR-2; NOAA-75070102; LC-75-6388) Avail: NTIS HC $5.00 CSCL 08F

Data collection programs conducted in Biscayne Bay to determine the changes that have occurred to this marine ecosystem and to monitor future changes are cited. A literature survey for Biscayne Bay is included. GRA

N76-21787# Rockwell International Corp., Thousand Oaks, Calif. Science Center.

REGIONAL AIR POLLUTION STUDY: EXPEDITIONARY RESEARCH PROGRAM, SUMMER 1975 Final Report
William C. Zegel Feb. 1976 110 p Prepared by Ryckman, Edgerley, Tomlinson, and Associates, Inc.
(Contract EPA-68-02-1081)
(PB-252035/1; EPA-600/3-76-018) Avail: NTIS HC $5.50 CSCL 13B

Local and regional scale air quality simulation models are studied by the Regional Air Pollution Study (RAPS). Inherent in this effort is the creation of a comprehensive, accurate, and readily-retrievable data base containing emission rates, concentrations of atmospheric pollutants, and pertinent meteorological measurements. An integrated program was prepared for the conduct of the RAPS which includes data collection on both a routine and an expeditionary basis. The Summer 1975 RAPS Expeditionary Research Program which was designed to procure detailed atmospheric observations to better understand selected pollutant and atmospheric phenomena is described. Data collection activities are described in each of four areas: (1) pollutant transport and dispersion; (2) pollutant transformation and removal; (3) pollutant measurement program; and (4) pollutant effects studies. GRA

N77-12904# Naval Weapons Center, China Lake, Calif.

AN ANALYSIS OF DATA INPUT SYSTEMS AND A SURVEY OF OTHER DATA BASES FOR THE NAVAL ENVIRONMENTAL PROTECTION SUPPORT SERVICE (NEPSS) Final Report, Jul. 1974 - Jun. 1976
Peggy A. Davis May 1976 41 p refs
(YF57572002)
(AD-A035085; NWC-TP-5820) Avail: NTIS HC A03/MF A01 CSCL 13/2

This report describes two areas of investigation. First, an analysis effort aimed at defining an improved data acquisition and handling system for the Naval Environmental Protection Support Service (NEPSS). Second, a survey of other environmental data bases complementary to the NEPSS system which can be called upon as additional sources of environmental information. Author (GRA)

N77-24044# Midwest Research Inst., Kansas City, Mo.

FINE PARTICLE EMISSIONS INFORMATION SYSTEM USER GUIDE
M. P. Schrag, A. K. Rao, G. S. McMahon, and G. L. Johnson Jun. 1976 232 p refs 2 Vol

(Contract EPA-68-02-1324)
(PB-262720/6; ERA-600/2-76-172) Avail: NTIS
HC A11/MF A01 CSCL 13B

The Fine Particle Emissions Information System (FPEIS) is a computerized information system containing information on primary fine particle emissions to the atmosphere from stationary point sources and evaluations of control devices. The purpose of the system is to provide a centralized source of fine particle measurement information and data for use by engineers and scientists engaged in fine particle control technology development. This document constitutes an extensive user guide to the FPEIS. Detailed instructions for encoding FPEIS data sets are presented, along with a copy of the Standard FPEIS data input forms. Both Off-line and on-line Request procedures for users are explained. GRA

N77-24845# Midwest Research Inst., Kansas City, Mo.
FINE PARTICLE EMISSIONS INFORMATION SYSTEM REFERENCE MANUAL
M. P. Schrag, A. K. Rao, G. S. McMahon, and G. L. Johnson Jun. 1976 82 p refs 2 Vol.
(Contract EPA-68-02-1324)
(PB-262721/4; EPA-600/2-76-173) Avail: NTIS
HC A05/MF A01 CSCL 13B

A computerized data base is compiled on primary fine particle emissions to the atmosphere from stationary sources. The data base is a basic reference manual designed to assist engineers and scientists engaged in fine particle control technology development. The FPEIS will contain source test data including particle size distributions; chemical, physical, and bioassay testing results performed on particulate samples; design and typical operating data on particle control systems applied; process descriptions of the sources; and descriptions of the sampling equipment and techniques employed. It identifies and discusses the input data requirements and protocol. For reference, it includes a list of available information request procedures, and describes the general data base management system used to implement the FPEIS. GRA

N77-26880# Royal Netherlands Meteorological Inst., De Bilt.
APPLICATION OF THE RECOMMENDED NATIONAL AIR POLLUTION MODEL OF THE NETHERLANDS TO THE NATO COMMON DATA BASE FOR THE FRANKFURT AREA
F. T. M. Nieuwstadt and C. A. Engeldal 1976 17 p refs
(KNMI-WR-76-17) Avail: NTIS HC A02/MF A01

The air pollution model described was applied to the NATO/CCMS data base, and the annual averaged concentration was calculated. A distinction was made between the contributions due to area source emissions and those due to point source emissions. The results for the annual averaged concentration are presented in the form of isopleth maps and are also given for six specified receptor locations. The calculated concentrations are compared with preliminary results. Author (ESA)

N77-26893# Midwest Research Inst., Kansas City, Mo.
PROCEEDINGS: FINE PARTICLE EMISSIONS INFORMATION SYSTEM USER WORKSHOP
M. P. Schrag Jan. 1977 138 p refs Conf. proc. held at Res. Triangle Park, N. C., 15 Jun. 1976
(Contract EPA-68-02-1324)
(PB-263468/1; EPA-600/7-77-001) Avail: NTIS
HC A07/MF A01 CSCL 05B

The Fine Particle Emissions Information System (FPEIS) was described. FPEIS is a computerized information system on fine particle emissions from stationary sources and may contain source test data including particle size distribution; chemical, physical, and bioassay testing results; design and performance data on particle control systems; process descriptions; and descriptions of sampling equipment and techniques employed. GRA

N77-28848# Research Triangle Inst., Research Triangle Park, N. C. Operations Analysis Div.
COMPREHENSIVE DATA HANDLING SYSTEM. AIR QUALITY DATA HANDLING SUBSYSTEM (AQDHS-II) PROGRAM DOCUMENTATION AND USER'S GUIDE. SECOND EDITION Final Report
Apr. 1977 454 p
(Contract EPA-68-02-1386)
(PB-266353/2; EPA-450/3-74-045-1) Avail: NTIS
HC A20/MF A01 CSCL 13B

The Air Quality Data Handling System (AQDHS-II) provides air pollution control agencies with the capability to create and maintain their own air quality data base and to retrieve data and generate reports from that data base. This report contains documentation for the computer programs which comprise AQDHS-II. It is also written as a Users Guide with each program described, input requirements described, field descriptions, etc. In addition to the basic system, several preprocessor and postprocessor programs are provided which perform functions necessary to make this system compatible with existing systems such as SAROAD and the original AQDHS. The system has a powerful retrieval capability which allows the user to retrieve virtually any piece of data in his file. The system also allows the user to automatically generate his quarterly air quality progress report in SAROAD format. GRA

N77-29884# Environmental Research and Technology, Inc., Concord, Mass.
THE LIVERMORE REGIONAL AIR QUALITY MODEL (LIRAQ): A TECHNICAL REVIEW AND MARKET ANALYSIS
Arthur Bass, Alan Q. Eschenroder, and Bruce A. Egan Feb. 1977 76 p refs
(Grant NSF ENV-76-19981)
(PB-266066/0; ERT-P-2348-1) Avail: NTIS
HC A05/MF A01 CSCL 13B

The marketability of the LIRAQ air quality simulation model, which was designed for use in the San Francisco Bay area is investigated. Variety of air quality policy, planning, and assessment studies is also studied. LIRAQ exists in two versions. The first, LIRAQ-1 treats pollutant species such as carbon monoxide which are non-reactive. The second version, LIRAQ-2, treats reactive pollutants such as non-methane hydrocarbons, ozone and nitrogen dioxide. The following topics are reviewed: (1) summary findings and recommendations concerning the present model; (2) a technical review of the LIRAQ model, which includes the general characteristics, program architecture, and verification history; (3) the data requirements for usage of the model; (4) a comparison of LIRAQ with other models including trajectory and grid models; (5) a market analysis of LIRAQ; and (6) transfer of LIRAQ model technology. An appendix includes a sample output of a problem formulator. GRA

N78-29846# TRW, Inc., Redondo Beach, Calif.
ENVIRONMENTAL ASSESSMENT OF HIGH-BTU GASIFICATION Annual Report, May - Oct. 1977
M. Ghassemi and C. Murray Feb. 1978 87 p refs
(Contract EPA-68-02-2635)
(PB-278175/5; EPA-600/7-78-025) Avail: NTIS
HC A05/MF A01 CSCL 07A

Environmental impacts are assessed that are associated with technologies for converting coal to high-Btu gaseous fuel and to identify control technologies required to reduce or eliminate adverse environmental impacts associated with commercial operation. The program consists of: evaluating existing processes and environmental data; acquiring supplementary data through sampling and analyzing process waste streams; and environmental assessment and process engineering support studies. A modular approach was chosen for analyzing and presenting data on gasification, gas treatment, pollution control, and integrated facilities. Draft gasification data sheets were prepared for some of the processes considered. GRA

N79-14608# Midwest Research Inst., Kansas City, Mo.
FINE PARTICLE EMISSIONS INFORMATION SYSTEM REFERENCE MANUAL, JANUARY - MAY 1978
M. P. Schrag Jun. 1978 102 p refs
(Contract EPA-68-02-2641)
(PB-286004/7; EPA-600/8-78-007) Avail: NTIS
HC A06/MF A01 CSCL 05B

A basic reference manual on the Fine Particle Emissions Information System (FPEIS), a computerized database on primary fine particle emissions to the atmosphere from stationary point sources is reported. The FPEIS is a component of the Environmental Assessment Data Systems (EADS) which is designed to aid researchers in environmental assessment and fine particle control technology development activities. The FPEIS contains source test data including particle size distributions; chemical, physical, and bioassay testing results performed on particulate samples; design and typical operating data on particulate control systems applied; process descriptions and the sources; and descriptions of the sampling equipment and techniques employed. The FPEIS describes the data types contained in the database, and identifies and discusses the input data requirements and protocol. GRA

N79-14810# Pennsylvania Dept. of Environmental Resources, Harrisburg. Bureau of Water Quality Management.
DATA BASE SYSTEM FOR STATE WATER QUALITY MANAGEMENT INFORMATION SYSTEM Final Report
John Kitch May 1978 33 p refs
(Grant EPA-S-801000)
(PB-286180/5; EPA-600/5-78-007) Avail: NTIS HC A03/MF A01 CSCL 05B

The WAMIS Release II Data Base Management System is described. The system design, development procedures, overview of data and a discussion of problems and recommendations are included. The appendixes contain the system detail. GRA

N79-14822# Midwest Research Inst., Kansas City, Mo.
FINE PARTICLE EMISSIONS INFORMATION SYSTEM USER GUIDE Progress Report, Jan. - May 1978
M. P. Schrag Jun. 1978 308 p
(Contract EPA-68-02-2641)
(PB-285877/7; EPA-600/8-78-006) Avail: NTIS HC A14/MF A01 CSCL 13B

An extensive user guide to the Fine Particle Emissions Information System (FPEIS), a computerized database on primary fine particle emissions to the atmosphere from stationary point sources is reported. The FPEIS is a component of the Environmental Assessment Data Systems (EADS) which is designed to aid researchers in environmental assessment and fine particle control technology developed activities. Detailed instructions for encoding FPEIS datasets, along with a copy of the FPEIS data input form are presented. Procedures are discussed which will provide users with access to the FPEIS either by direct computer request for authorized National Computer Center (NCC) accounts or by written request to the EPA project officer. A list of standard data inquiry and retrieval requests, with instructions for their use is given. GRA

N79-18487# TRW, Inc., Redondo Beach, Calif. Environmental Engineering Div.
ENVIRONMENTAL ASSESSMENT DATA BASE FOR HIGH-Btu GASIFICATION TECHNOLOGY. VOLUME 1: TECHNICAL DISCUSSION Final Report, Jun. 1977 - Aug. 1978
M. Ghassemi, K. Crawford, and S. Quinlivan Sep. 1978 172 p refs 3 Vol.
(Contract EPA-68-02-2635)
(PB-288602/6; EPA-600/7-78-186A) Avail: NTIS HC A08/MF A01; also available in set of 3 reports HC E13 as PB-288601-SET CSCL 07A

The existing data base for the EA of treated effluent of this quality is acceptable for discharge under the San Leandro Municipal Discharge Limitations with the exception of the phenolic compound and total cyanide loadings is analyzed and summarized. Surcharges would be imposed, however, based on the suspended solids and BOD loadings. If significant levels of phenolic compounds and cyanide are not present in a particular plant's wastewater discharge, ultrafiltration is judged capable of meeting local Municipal Discharge Standards. When phenolic compounds and cyanide are present at significant levels either ozonation or reverse osmosis are considered the preferred post-treatment processes. None of the treatment system options investigated is considered capable of reducing adhesives and sealants manufacturing plant wastewater BOD and COD loadings to the recommended Effluent Limitations Guidelines. GRA

N79-18488# TRW, Inc., Redondo Beach, Calif. Environmental Engineering Div.
ENVIRONMENTAL ASSESSMENT DATA BASE FOR HIGH-Btu GASIFICATION TECHNOLOGY. VOLUME 2: APPENDICES A, B, AND C Final Report, Jun. 1977 - Aug. 1978
M. Ghassemi, K. Crawford, and S. Quinlivan Sep. 1978 415 p refs 3 Vol.
(Contract EPA-68-02-2635)
(PB-288603/4; EPA-600/7-78-186B) Avail: NTIS HC A18/MF A01; also Available in set of 3 reports HC E13 as PB288601-SET CSCL 07A

The existing data base for the EA of technology is reported and limitations of available data are identified. Results of the data base analysis indicate that there currently are insufficient data for comprehensive EA. The data are limited since: (1) there are no integrated plants, (2) some of the pilot plant data are not applicable to commercial operations, (3) available pilot plant data are generally not very comprehensive in that not all streams and constituents/parameters of environmental interest are addressed, (4) there is a lack of experience with control processes/equipment in high-Btu gasification service, and (5) toxicological and ecological implications of constituents in high-Btu gasification waste streams are not established. GRA

N79-18489# TRW, Inc., Redondo Beach, Calif. Environmental Engineering Div.
ENVIRONMENTAL ASSESSMENT DATA BASE FOR HIGH-Btu GASIFICATION TECHNOLOGY. VOLUME 3: APPENDICES D, E, AND F Final Report, Jun. 1977 - Aug. 1978
M. Ghassemi, K. Crawford, and S. Quinlivan Sep. 1978 342 p refs 3 Vol.
(Contract EPA-68-02-2635)
(PB-288604/2; EPA-600/7-78-186C) Avail: NTIS HC A15/MF A01; also available in set of 3 reports HC E13 as PB-288601-SET CSCL 07A

The existing data base for the EA of technology is reported and limitations of available data are identified. Results of the data base analysis indicate that there currently are insufficient data for comprehensive EA. A number of programs are currently under way or planned which should generate some of the needed data. GRA

N79-22877# Monsanto Research Corp., Dayton, Ohio.
SOURCE ASSESSMENT: NONCRITERIA POLLUTANT EMISSIONS, 1978 UPDATE Final Report, Apr. 1978 - Jul. 1978
E. C. Eimutis, R. P. Quill, and G. M. Rinaldi Jul. 1978 152 p refs
(Contract EPA-68-02-1874)
(PB-291747/4; MRC-DA-798; EPA-600/2-78-004T) Avail: NTIS HC A08/MF A01 CSCL 13B

Stationary sources are listed that emit each of 389 noncriteria pollutants quantities of such emissions are indicated. The list was prepared using a computerized data base established for emissions of air pollutants from approximately 800 stationary source types in the combustion, organic materials, inorganic materials, and open source categories. A source type is defined as a group of emission sources which have the same process and emission characteristics. GRA

N79-25544# National Aviation Facilities Experimental Center, Atlantic City, N. J.
EXHAUST EMISSIONS CHARACTERISTICS FOR A GENERAL AVIATION LIGHT-AIRCRAFT AVCO LYCOMING IO-360-A1B6D PISTON ENGINE Final Report
Eric E. Becker Feb. 1979 94 p refs
(FAA Proj. 201-521-100)
(AD-A066556; FAA-NA-78-49; FAA-RD-78-142) Avail: NTIS HC A05/MF A01 CSCL 13/2

A steady state exhaust emissions data base was developed. This data base consisted of current production baseline emissions characteristics, lean-out emissions data, effects of leaning-out the fuel schedule on cylinder head temperatures, and data showing ambient effects on exhaust emissions and cylinder head temperatures. The engine operating with its current full-rich production fuel schedule did not meet the proposed Environmental Protection Agency (EPA) standard for carbon monoxide (CO) under sea level, standard-day conditions. The engine did, however, meet the proposed EPA standards for unburned hydrocarbons (HC) and oxides of nitrogen (NOx) under the same sea level test conditions. The results of testing the engine under different ambient conditions (hot day) were also presented, and these results showed a trend toward higher levels of emissions output for CO and HC while producing slightly lower levels of NOx. Author

N79-26648# National Aviation Facilities Experimental Center, Atlantic City, N. J.
EXHAUST EMISSIONS CHARACTERISTICS FOR A GENERAL AVIATION LIGHT-AIRCRAFT AVCO-LYCOMING IO-360-B1BD PISTON ENGINE Final Report
Eric E. Becker Feb. 1979 91 p refs
(FAA Proj. 201-521-100)
(AD-A066580; FAA-NA-78-28; FAA-RD-78-129) Avail: NTIS HC A05/MF A01 CSCL 13/2

A steady state exhaust emissions data base was developed. This data base consisted of current production baseline emissions characteristics, lean-out emissions data, effects of leaning-out the fuel schedule on cylinder head temperatures, and data showing ambient effects on exhaust emissions and cylinder head temperatures. The engine operating with its current full-rich production fuel schedule did not meet the proposed Environmental Protection Agency (EPA) standard for carbon monoxide (CO) and unburned hydrocarbons (HC) under sea level standard-day conditions. The engine did, however, meet the proposed EPA standards for oxides of nitrogen (NOx) under the same sea level conditions. The results of engine testing under different ambient conditions were also presented, and these results showed a trend toward higher levels of emissions output for CO and HC while producing slightly lower levels of NOx. R.E.S.

N79-26884# Rockwell International Corp., Creve Couer, Mo. Air Monitoring Center.
REGIONAL AIR POLLUTION STUDY. POINT SOURCE METHODOLOGY AND EMISSION INVENTORY Final Report
F. E. Littman Jul. 1978 160 p refs
(Contract EPA-68-02-2093)
(PB-290921/1; EPA-600/4-78-042) Avail: NTIS HC A08/MF A01 CSCL 13B

The development of the point source emission data inventory for the Regional Air Pollution Study at St. Louis is discussed. To meet the unusual requirements of this study, which specified the acquisition of hourly, measured emission data for the St. Louis Air Quality Control Region for a period of two years, a unique methodology was developed and put into practice. The result is a data base containing over 20 million pieces of information in a readily accessible form. GRA

N79-27879# Teknekron, Inc., Waltham, Mass.
COMPILATION AND ANALYSIS OF DATA SETS FOR THE EVALUATION OF REGIONAL SULFATE MODELS
Eugene Y. Tong and Robert B. Batchelder *In* NATO Comm. on the Challenges of Mod. Soc. Proc. of the Ninth Intern. Tech. Meeting on Air Pollution Modeling and its Appl. 1978 p 407-416 refs Prepared in cooperation with Boston Univ., Mass.

Avail: NTIS HC A99/MF A01

Air quality and aerometric measurements were compiled to: (1) enable a delineation of those macroscale features in regional sulfate distribution which are important parameters considered in the development of predictive methods; (2) enable those researchers involved in model development work to evaluate their modeling procedures on common data sets so that the relative merits of various modeling methods may be delineated; and (3) provide an integrated data base as aerometric input to other research efforts which need immediate information as one of their planning tools. M.M.M.

N79-28888# Harvard Univ., Cambridge, Mass. Landscape Architecture Research Office.
THE INTERACTION BETWEEN URBANIZATION AND LAND QUALITY AND QUANTITY IN ENVIRONMENTAL PLANNING AND DESIGN. THE DATA BASE, TECHNICAL DOCUMENTATIONS
Carl Steinitz, Charles J. Frederick, and Peter Goodale Dec. 1978 182 p refs 2 Vol.
(Grant NSF ENV-72-03372)
(PB-294154/0; NSF/RA-780416) Avail: NTIS HC A08/MF A01 CSCL 13B

The data base described provides an efficient, accurate, easily used and flexible system to meet the information needs of the various component models of the research effort. The basic unit used to construct the data base is a grid cell of one hectare (2.47 acres). The study area contains 75,800 cells, over half of which represent land undeveloped in 1973. The data base contains four types of data: physiographic and natural systems, man made elements of land use and land cover, data associated with political jurisdictions and functional zones and data created by combinations of the first three types and/or derived from the operation of the models. GRA

N79-32748# Argonne National Lab., Ill.
SURVEY OF BIOMEDICAL AND ENVIRONMENTAL DATA BASES, MODELS, AND INTEGRATED COMPUTER SYSTEMS AT ARGONNE NATIONAL LABORATORY
I. P. Murarka, D. J. Bodeau, J. M. Scott, and R. H. Huebner Aug. 1978 355 p
(Contract W-31-109-eng-38)
(ANL/ES-65) Avail: NTIS HC A16/MF A01

An inventory (index) of information resources pertaining to biomedical and environmental projects at Argonne National Laboratory is presented. The information resources include a data base, model, or integrated computer system. Entries are categorized as models, numeric data bases, bibliographic data bases, or integrated hardware/software systems. Descriptions of the Information Coordination Focal Point (ICFP) program the system for compiling this inventory, and the plans for continuing and expanding it are given, and suggestions for utilizing the services of the ICFP are outlined. DOE

N80-14862# Commission of the European Communities, Luxembourg. Directorate-Gen. Res., Sci. and Ed.
ENVIRONMENT AND THE QUALITY OF LIFE Final Report
1978 460 p refs Partly in ENGLISH, GERMAN and FRENCH
(EUR-5970; ISBN-92-825-0185-X) Copyright. Avail: NTIS HC A20/MF A01

One hundred twenty-seven contracts, conducted between 1973 and 1975, are summarized under six headings. These are epidemiological surveys, harmful effects of lead pollution, health effects of micropollutants, ecological effects of water pollutants, remote sensing of air pollution, and establishment of a data bank on environmental chemicals. Epidemiological studies were mostly concerned with the relationship between air pollution and respiratory disease in children. Micropollutant health effects cover a range of substances, including nitrogen compounds, asbestos fibers, detergents, heavy metals, and pesticides with their effects on various tissues. The Environmental Chemical Data and Information Network is also discussed. Author (ESA)

N80-16889# Midwest Research Inst., Kansas City, Mo.
FINE PARTICLE EMISSIONS INFORMATION SYSTEM Annual Report, Jan. - Dec. 1978
M. P. Schrag, J. P. Reider, and F. N. Young May 1979 54 p refs
(Contract EPA-68-02-2641)
(PB80-100449; EPA-600/7-79-128) Avail: NTIS HC A04/MF A01 CSCL 05B

A computerized data base on primary fine particle emissions from stationary sources is described. Changes made in 1978, including the expanded reporting of chemical analysis data, the entering of confidential or proprietary data, the entering of confidential or proprietary data, and the development of computer software to aid users in interpreting the Fine Particle Emissions Information System (FPEIS) data are summarized. Data added to the FPEIS in 1978 and objectives for 1979, including the addition of biological and radiological analysis results and the implementation of a new source categorization protocol are included. The FPEIS provides a centralized inventory of fine particle measurement information for researchers engaged in fine particle control technology development and in the environmental assessment of energy and industrial processes. GRA

N80-24880# Rockwell International Corp., Newbury Park, Calif. Air Monitoring Center.
QUALITY ASSURANCE IN SUPPORT OF ENERGY RELATED MONITORING ACTIVITIES Annual Report
Mark Cher Jun. 1979 69 p refs
(Contract EPA-68-02-2412)
(PB80-135270; AMC-8303.135-AR-2; EPA-600/7-79-136; AR-2) Avail: NTIS HC A04/MF A01 CSCL 13B

A program to establish a quality assurance data base for ambient air monitoring around present and proposed energy development projects, and to provide technical assistance to enable existing monitoring networks to achieve a high level of data quality is described. Results from laboratory performance surveys carried out for the analysis of sulfate, nitrate, SO2, NO2, and CO and for weight measurements and high volume flow rate are given. GRA

N80-29917# SRI International Corp., Menlo Park, Calif. Atmospheric Science Center.
EVALUATION OF THE REAL-TIME AIR-QUALITY MODEL USING THE RAPS (REGIONAL AIR POLLUTION STUDY) DATA BASE. VOLUME 1: OVERVIEW Final Report, 1 Oct. 1977 - 1 Apr. 1979
Ronald E. Ruff Feb. 1980 30 p refs 4 Vol.
(Contract EPA-68-02-2770)
(PB80-178346; Rept-6868-FR-Vol-1;
EPA-600/4-80-013A-Vol-1) Avail: NTIS HC A03/MF A01; also available in set of 4 reports HC E12 as PB80-178338 CSCL 04A

The theory and programming of statistical tests for evaluating the Real-Time Air-Quality Model (RAM) using the Regional Air Pollution Study (RAPS) data base are fully documented. Moreover, the tests are generally applicable to other model evaluation problems. An overview of the tests, displays, software, and application of the resulting statistical package are presented. GRA

N80-29918# SRI International Corp., Menlo Park, Calif. Atmospheric Science Center.
EVALUATION OF THE REAL-TIME AIR-QUALITY MODEL USING THE RAPS (REGIONAL AIR POLLUTION STUDY) DATA BASE. VOLUME 2: STATISTICAL PROCEDURES Final Report, 1 Oct. 1977 - 1 Apr. 1979
Harold S. Javitz and Ronald E. Ruff Feb. 1980 57 p refs 4 Vol.
(Contract EPA-68-02-2770)
(PB80-178353; Rept-6868-FR-Vol-2;
EPA-600/4-80-013B-Vol-2) Avail: NTIS HC A04/MF A01; also available in set of 4 reports HC E12 as PB80-178338 CSCL 04A

The tests considered for evaluating air quality simulation models in general and those that would be useful in evaluating the RAM are presented. The capability of the RAM to predict sulfur dioxide (SO2) concentrations was of particular interest. Specific tests for both intermediate and final evaluations are recommended, with accompanying descriptions of formats, plots, and procedures to establish confidence limits. Discussion focuses on the mathematics, procedures, and interpretation of the individual tests; their relevance to the project objectives; and possible trade offs among tests. GRA

N80-29919# SRI International Corp., Menlo Park, Calif. Atmospheric Science Center.
EVALUATION OF THE REAL-TIME AIR-QUALITY MODEL USING THE RAPS (REGIONAL AIR POLLUTION STUDY) DATA BASE. VOLUME 3: USER'S GUIDE Final Report, 1 Oct. 1977 - 1 Apr. 1979
Ronald E. Ruff, Hisao Shigeishi, and Rodney H. Allen (Comp-Aid, Inc., Research Triangle Park, N.C.) Feb. 1980 141 p refs 4 Vol.
(Contract EPA-68-02-2770)
(PB80-178361; Rept-6868-FR-Vol-3;
EPA-600/4-80-013C-Vol-3) Avail: NTIS HC A07/MF A01; also available in set of 4 reports HC E12 as PB80-178338 CSCL 04A

The software used in the statistical tests for evaluating the RAM is presented. Six statistical tests are described, with attention to the programming philosophy behind them. Also presented is a review of the auxiliary software that sort, retrieve, format, and display the data. GRA

N80-29920# SRI International Corp., Menlo Park, Calif. Atmospheric Science Center.
EVALUATION OF THE REAL-TIME AIR-QUALITY MODEL USING THE RAPS (REGIONAL AIR POLLUTION STUDY) DATA BASE. VOLUME 4: EVALUATION GUIDE Final Report, 1 Oct. 1977 - 1 Apr. 1979
Ronald E. Ruff Feb. 1980 59 p refs 4 Vol.
(PB80-178379; Rept-6868-FR-Vol-4;
EPA-600/4-80-013D-Vol-4) Avail: NTIS HC A04/MF A01; also available in set of 4 reports HC E12 as PB80-178338 CSCL 04A

The application and interpretation of the statistical programs, particularly with regard to use on the RAM is discussed. In general, there is no set procedure for evaluating an air quality model because of the different reasons for evaluating models and many subjective decisions to be made during the process. However, guidelines are presented to cover a wide variety of evaluation needs, with attention to data preparation, classification, analysis, selection and application of tests, and interpreation of results. Several methods of diagnosing causes of poor model performance are discussed and some sample program outputs are also provided. GRA

N80-33979*# National Oceanic and Atmospheric Administration, Washington, D. C. Environmental Data and Information Service.
PROCEEDINGS OF THE WORKSHOP ON GOVERNMENT OIL SPILL MODELING
Joseph M. Bishop, comp. Feb. 1980 32 p Workshop held at Wallops Island, Va., 7-9 Nov. 1979
(NASA-CR-163840; PB80-190945; NOAA-80042401) Avail: NTIS HC A03/MF A01 CSCL 13B

Oil spill model users and modelers were brought together for the purpose of fostering joint communication and increasing understanding of mutual problems. The workshop concentrated on defining user needs, presentations on ongoing modeling programs, and discussions of supporting research for these modeling efforts. Specific user recommendations include the development of an oil spill model user library which identifies and describes available models. The development of models for the long-term fate and effect of spilled oil was examined. GRA

N80-33981# Midwest Research Inst., Kansas City, Mo. Environmental Systems Dept.
FINE PARTICLE EMISSIONS INFORMATION SYSTEM Annual Report, Jan. - Dec. 1979
J. P. Reider and R. F. Hegarty May 1980 67 p refs
(Contract EPA-68-02-2641; MRI Proj. 4396-L)
(PB80-195753; EPA-600/7-80-092) Avail: NTIS HC A04/MF A01 CSCL 05B

The Fine Particle Emissions Information System (FFES) is a computerized inventory of the particle measurement information for researchers engaged in fine particle control technology development and in the environmental assessment of energy and industrial processes. GRA

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

A75-28582 # **Insolation in the United States - An overview.** M. Riches (NOAA, National Weather Service, Silver Spring, Md.). *American Institute of Aeronautics and Astronautics and American Astronautical Society, Solar Energy for Earth Conference, Los Angeles, Calif., Apr. 21-24, 1975, AIAA Paper 75-614.* 6 p. 13 refs.

The National Oceanic and Atmospheric Administration operates a solar radiation monitoring network through its component the National Weather Service. The availability of the data and its accuracy are presented. An example is provided to acquaint the user with the techniques to remove known errors in the data base. Future improvements in the network and its support are also discussed. Further, a brief review of sensors available for user projects is presented. (Author)

A76-34287 **Sources of insolation data.** C. M. Randall (Aerospace Corp., El Segundo, Calif.). In: Optics in solar energy utilization; Proceedings of the Seminar, San Diego, Calif., August 21, 22, 1975. Palos Verdes Estates, Calif., Society of Photo-Optical Instrumentation Engineers, 1975, p. 23-28. 10 refs. NSF Grant No. C-983.

Hourly solar radiation (insolation) data bases have been prepared for use in the computer simulation of solar energy systems. These data collections have been based on actual insolation observations or closely related weather observations. The inadequacies of the presently available insolation data have required that portions of the data be estimated by the use of the statistical procedures discussed in detail in the paper. (Author)

A76-40989 * # **EUV absorption analysis of thermospheric structure from AE-satellite observations of 1974-1976.** H. E. Hinteregger (USAF, Geophysics Laboratory, Bedford, Mass.) and L. M. Chaikin (Computer Usage Co., Beltsville, Md.). *COSPAR, Plenary Meeting, 19th, Philadelphia, Pa., June 8-19, 1976, Paper.* 16 p. Contract No. DPR-350030AG.

Atmospheric absorption characteristics at various selected wavelengths of solar EUV emission have been observed by spectrophotometers on the Atmosphere Explorer satellites. Two levels of results are defined as (A) results independent of any cross section values and involving no specific atmospheric model assumptions, and (B) results expressed in terms of particle concentrations, mass density, and other aeronomical parameters. The present report will mostly deal with results of type B, with emphasis on molecular oxygen. Studies of EUV-derived results in correlation with results of other simultaneous experiments on the same satellite are expected soon to improve the assessment of technique-peculiar errors, possible errors in the various EUV cross sections or accommodation coefficients, and lead to the design of a 'correlative approach' based on the use of mixed inputs of the most reliable aspects of one and the other types of observations, respectively. (Author)

A77-48925 **Solar radiation data base development based on bright sunshine data.** G. E. Smith (Calgary, University, Calgary, Alberta, Canada). In: Sharing the sun: Solar technology in the seventies; Proceedings of the Joint Conference, Winnipeg, Canada, August 15-20, 1976. Volume 1. Cape Canaveral, Fla., International Solar Energy Society, 1976, p. 226-237.

A77-48926 **Distribution of direct and total solar radiation availabilities for the USA.** E. C. Boes, I. J. Hall, R. R. Prairie, R. P. Stromberg, and H. E. Anderson (Sandia Laboratories, Albuquerque, N. Mex.). In: Sharing the sun: Solar technology in the seventies; Proceedings of the Joint Conference, Winnipeg, Canada, August 15-20, 1976. Volume 1. Cape Canaveral, Fla., International Solar Energy Society, 1976, p. 238-263. 6 refs. ERDA-sponsored research.

A79-22776 * **Global model of longitude/UT variations in thermospheric composition and temperature based on mass spectrometer data.** A. E. Hedin, C. A. Reber, N. W. Spencer, H. C. Brinton (NASA, Goddard Space Flight Center, Laboratory for Planetary Atmospheres, Greenbelt, Md.), and D. C. Kayser (Minnesota, University, Minneapolis, Minn.). *Journal of Geophysical Research*, vol. 84, Jan. 1, 1979, p. 1-9. 27 refs.

Measurements of N2, O, He, and Ar densities from neutral gas mass spectrometers on four satellites and inferred O2 and H densities from an ion mass spectrometer have been combined to produce a model of longitude/UT variations in thermospheric neutral composition and temperature. The longitude/UT model is an extension of the mass spectrometer-incoherent scatter thermospheric model (Hedin et al., 1977) and uses spherical harmonic terms dependent on geographic latitude, longitude, and UT. The combined longitude and UT variations reflect the influence of the geomagnetic field but indicate that the variations may not simply be represented in magnetic coordinates. B.J.

A79-40433 # **The TAIYO data basis and its integrated analysis.** K. Suzuki and K. Hirao (Tokyo, University, Tokyo, Japan). *(University of Tokyo, Symposium on the Ionospheric Research, Tokyo, Japan, Mar. 22-24, 1978.) Journal of Geomagnetism and Geoelectricity*, vol. 31, Supplement, 1979, p. S 3-S 8. 8 refs.

The purpose of the Japanese aeronomy satellite TAIYO is to investigate the structure of the thermosphere during quiet solar conditions. Experiments aboard TAIYO are briefly described and attention is given to telemetry and data coverage, integrated data analysis, and coordinate analysis of TAIYO and Aeros-B measurements. B.J.

A79-50503 **Modelling of EHF propagation in clear air.** M. J. Liebe and R. K. Rosich (National Telecommunications and Information Administration, Institute for Telecommunication Sciences, Boulder, Colo.). In: Space instrumentation for atmospheric observation; Region V Annual Conference, El Paso, Tex., April 3-5, 1979, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 6-20. 20 refs.

The paper demonstrates how to use a spectroscopic data base in various applications. The base was expanded for satellite-originated radio paths to include the treatment of the O2-MS Zeeman effect which is important for the height range from 30 to 120 km. It is noted that a major uncertainty remaining is the prediction of anomalous water vapor absorption that can reduce the transparency in the four EHF window ranges at high relative humidities, and which is accounted for by an empirical relationship. Computer calculations of atmospheric transfer characteristics were performed using numerical approximations for the cumulative behavior of slant paths. Results from these modeling efforts are presented and their implications to communication and remote sensing applications are discussed. V.T.

A80-24182 * **Temperature dependence of the rate coefficient for charge exchange of metastable O/+//2D/ with N2.** M. R. Torr (Michigan, University, Ann Arbor, Mich.) and D. G. Torr (South African Council for Scientific and Industrial Research, National Institute for Telecommunications Research, Johannesburg, Republic of South Africa). *Geophysical Research Letters*, vol. 7, Jan. 1980, p. 103-105. 15 refs. Contract No. NAS5-24331.

Using a data base of aeronomical parameters measured on board the Atmosphere Explorer-C satellite, temperature dependence of the reaction rate coefficient is deduced for the charge exchange of O(+)(2D) with N2. The results indicate the Explorer values determined over the temperature range from 700 to 1900 K are not in conflict with laboratory measurements made at higher temperatures. V.P.

A80-30647 # **High-latitude analytical formulas for scintillation levels.** J. Aarons (USAF, Geophysics Laboratory, Bedford, Mass.), E. MacKenzie (Emmanuel College, Boston, Mass.), and K. Bhavnani (Logicon, Inc., Bedford, Mass.). *Radio Science*, vol. 15, Jan.-Feb. 1980, p. 115-127. 22 refs.

The paper deals with the seasonal, solar flux, and magnetic dependence at auroral and subauroral latitudes as well as at a mid-latitude station. Analytical formulas are developed from a large data base. The data base used is a series of measurements of the scintillations of one synchronous satellite beacon, ATS 3, transmitting at 137 MHz. The analytical terms provide mean scintillation excursions as a function of time of day, month, solar flux, and magnetic index. V.T.

A80-37401 **The time structure of transionospheric radio wave scintillation.** C. L. Rino and J. Owen (SRI International, Menlo Park, Calif.). *Radio Science*, vol. 15, May-June 1980, p. 479-489. 13 refs. Contract No. DNA001-77-C-0220.

The time structure of a representative set of weakly and strongly scintillating transionospheric beacon signals is analyzed. Under conditions of weak scatter, the coherence time of the signal intensity is a monotonic function of the Fresnel radius divided by the effective scan velocity. The shape of the function, however, is controlled by the power law index. Data from a Peruvian station show evidence of a slightly steeper spectral distribution than do data from Kwajalein in the Marshall Islands. Under conditions of strong scattering, the intensity coherence time depends only on the perturbation strength. The strong scatter data show remarkably little dispersion when they are plotted against the perturbation strength. The data are all consistent with a phase spectral slope somewhat less than 3, which is independently verified by using phase scintillation data. (Author)

N76-21888# National Oceanic and Atmospheric Administration, Boulder, Colo. Space Environment Lab.

A 1964 DIGITAL DATA BASE FOR IONOSPHERIC MODELING. PART A: BOTTOMSIDE ELECTRON DENSITY PROFILES

G. Goe, G. M. Lerfald, and R. B. Jurgens Oct. 1974 41 p refs

(COM-75-10075/0; NOAA-TM-ERL-SEL-35; NOAA-74121116) Avail: NTIS HC $3.75 CSCL 04A

Approximately 30,000 film ionograms recorded at ground-based ionospheric sounding stations during 1964 were selected for a pilot study to obtain true height profiles of electron density. A yield of 18,228 interpolated profiles was obtained using a new analysis system developed to automate as far as possible all of the digitizing and data processing steps but to retain the pattern recognition capabilities of a human in scaling the ionograms. The profiles of electron density extend from 90 km up to the height of the peak of the F-layer. One of the features of these profiles is that each is started using the same method. GRA

N76-25388*# Smithsonian Astrophysical Observatory, Cambridge, Mass.

GEOPHYSICAL DATA BASE

M. R. Williamson and L. R. Kirschner Feb. 1975 98 p

(Grant NGR-09-015-002)

(NASA-CR-142960; SAO-409-093) Avail: NTIS HC $4.75 CSCL 08E

A general data-management system that provides a random-access capability for large amounts of data is described. The system operates on a CDC 6400 computer using a combination of magnetic tape and disk storage. A FORTRAN subroutine package is provided to simplify the maintenance and use of the data. Author

N76-10612*# Environmental Research and Technology, Inc., Concord, Mass.

EXTENSION OF FOUR-DIMENSIONAL ATMOSPHERIC MODELS Final Report, Mar. 1974 - Apr. 1975

Mary Grace Fowler, Anthony S. Lisa, and Shu Lin Tung Oct. 1975 75 p refs

(Contract NAS8-30273)

(NASA-CR-143964; P-830F) Avail: NTIS HC $4.25 CSCL 04A

The cloud data bank, the 4-D atmospheric model, and a set of computer programs designed to simulate meteorological conditions for any location above the earth are described in turns of space vehicle design and simulation of vehicle reentry trajectories. Topics discussed include: the relationship between satellite and surface observed cloud cover using LANDSAT 1 photographs and including the effects of cloud shadows; extension of the 4-D model to the altitude of 52 km; and addition of the u and v wind components to the 4-D model of means and variances at 1 km levels from the surface to 25 km. Results of the cloud cover analysis are presented along with the stratospheric model and the tropospheric wind profiles. J.M.S.

N76-19882# Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.

PATTERN ANALYSIS AND CLASSIFICATION WITH THE NEW ACDA SEISMIC SIGNATURE DATA BASE Interim Report

C. H. Chen and I. Chang Lin 12 Aug. 1975 110 p refs

(Grant AF-AFOSR-2119-71; AF Proj. 9769)

(AD-A015925; AFOSR-75-1296TR) Avail: NTIS CSCL 08/11

The new and expanded ACDA seismic data base makes it possible for meaningful comparison of different seismic recognition techniques based on the same data set. There are 157 earthquake and 157 explosion records in the data base. Pattern analysis in frequency domain as well as two-dimensional space is performed to seek for classification clues. Although useful structure of the seismic records is not available, the mathematical features provided by the autocorrelation function have 86.36% correct recognition on testing set by using 3 features (autocorrelation coefficients), 80 selected good quality training samples per class and the nearest-neighbor decision rule. All samples in the training set are identified correctly and thus the overall recognition rate of 93.00% is achieved. This result is better than the 89.2% recognition using dynamic spectral ratios (Table 7). The autocorrelation coefficients which are simple to calculate also perform better than the linear predictor (Markel) coefficients and other discriminants. GRA

N76-21909# Air Force Global Weather Central, Offutt AFB, Nebraska.

THE AFGWC SNOW COVER ANALYSIS MODEL

Saba A. Luces, Samuel J. Hall, and James D. Martens 1 Jun. 1975 27 p refs

(AD-A017942; AFGWC-TM-75-1) Avail: NTIS CSCL 08/12

The report documents the Air Force Global Weather Central (AFGWC) Automated Snow Cover Analysis Model. It describes the data input, analysis procedures, problems, possible improvements and potential uses of the model. The hemispheric model became operational in March 1975. It uses hourly surface synoptic data, meteorological satellite video brightness data and climatological data to determine the depth and age of snow on the ground on a hemispheric grid with a 25 nmi spacing. The resulting daily analyses provide a Northern Hemisphere data base which is stored on high speed computers and available for many meteorological and other scientific applications. GRA

N76-29901# Defense Mapping Agency Aerospace Center, St. Louis, Mo. Gravity Library Branch.

HOLDINGS, STORAGE AND RETRIEVAL OF DOD GRAVITY LIBRARY DATA

Larry L. Dotson and Edward B. Reinholtz Sep. 1975 42 p refs

(AD-A020426; DMAAC/RP-75-003) Avail: NTIS CSCL 08/5

The Department of Defense (DOD) Gravity Library, maintained by the Defense Mapping Agency Aerospace Center, has grown from a small card storage file to a massive data file contained on magnetic tapes. In the growth process, the library has progressed from the use of a various assortment of card processing equipment to the use of a UNIVAC 1108 computer system. The tremendous increase in holdings and requirements necessitated the establishing of standard formats for all gravity and related data. The receipt of data in various forms and the reduction of this data to a common form made it necessary to develop improved processing techniques for inputting new data. Voluminous retrieval and maintenance of automated data required improved techniques when addressing inquiries to such large files. This report is intended to explain the holdings, system of storage, maintenance of files and retrieval of data. GRA

N76-31837# Naval Oceanographic Office, Washington, D.C.
A NUMERICAL ICE FORECASTING SYSTEM
Donald J. Gerson Oct. 1975 147 p refs
(AD-A023183; NOO-RP-8) Avail: NTIS CSCL 08/12

This forecasting system provides estimates of current ice thickness and forecasts of ice formation and thickness for 62 locations in the Arctic. It also provides forecasting aids such as selected sea surface temperatures, snow depths, mean daily air temperature trends, and degree-day accumulations. The observations are obtained on magnetic tape from the National Meteorological Center on a near-real-time basis. The forecast techniques are statistical processes based on local climatology. The system presently is producing outputs on a daily basis. It is expandable in design so that as new forecasting methods are developed they can be integrated into the program. Since the data base consists of all the world's synoptic weather observations, the expansion may be into fields other than ice prediction. GRA

N76-32750*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE PLASMAPAUSE REVISITED
Nelson C. Maynard and Joseph M. Gebowsky Sep. 1976 35 p refs Submitted for publication
(NASA-TM-X-71204; X-625-76-220) Avail: NTIS HC $4.00 CSCL 03B

Saturation of the dc double probe instrument on Explorer 45 was used to identify the plasmapause. A data base was developed to statistically study the average position of the plasmapause over 14.5 hours of magnetic local time under differing magnetic conditions. The afternoon-evening bulge in the L coordinate of the plasmapause versus local time was found centered between 20 and 21 hours MLT during magnetically quiet periods and shifted toward dusk as activity increased, but always post dusk. During quiet periods a bulge in the L coordinate near noon was also seen, which disappeared as activity increased. The average local time distribution plasmapause position during high magnetic activity was irregular in the afternoon region where large scale convection models predict the creation of plasmatails or detached plasma regions from increases in the solar wind induced convection. The results suggest that solar wind induced convection is partially shielded from the dayside. As the intensity of the convection is increased, it more effectively penetrates the dayside, which shifts the post dusk bulge nearer to dusk and eliminates the quiet-time bulge near noon. Author

N77-23869# Emmanuel Coll., Boston, Mass.
STUDY AND ANALYSIS OF TOTAL ELECTRON CONTENT AND SCINTILLATION DATA Progress Report, 1 Jul. 1975 - 30 Jun. 1976
Santimay Basu, Charles J. Cantor, James Johanson, Eileen Mackenzie, and M. Patricia Hagan Oct. 1976 107 p refs
(Contract F19628-76-C-0003; AF Proj. 4643)
(AD-A034490; AFGL-TR-76-0260; Scientific-1) Avail: NTIS HC A06/MF A01 CSCL 20/14

This report embodies a study of Ionospheric Scintillations as considered from the following aspects. 1) Overall view of scintillations using a large data base, and also the detailed, individual magnetic storm picture. Solar flux level, seasonal variation, invariant latitude, and irregularity region are discussed. 2) Total Electron Content measurements through Faraday Rotation and Group Delay Methods. Results of employment of these techniques are discussed. The M-factor, for conversion of Faraday Rotation angles is studied, and associated use of it is displayed through a program for which documentation is included. 3) Characteristics of scintillations in the weak and strong scatter regimes. Results of the frequency dependence of scintillations, power spectra, and autocorrelation of amplitude fluctuations are discussed. 4) Daytime VHF scintillations. Type 1, type 2, and E sub sq irregularities are discussed. 5) A modification to the Signal Analysis Package, previously developed, is described. Application for use on the CDC 6600. Author (GRA)

N77-24719# Air Force Geophysics Lab., Hanscom AFB, Mass. Space Physics Div.
A HIGH-LATITUDE EMPIRICAL MODEL OF SCINTILLATION EXCURSIONS: PHASE 1
Jules Aarons, John Mullen, Herbert Whitney, Eileen Martin, Krishin Bhavnani (Emmanuel College, Boston), and Leo Whelan (Logicon, Inc., Bedford, Mass.) 17 Sep. 1976 57 p refs
(AF Proj. 4643)
(AD-A034420; AFGL-TR-76-0210; AFGL-AFSG-353) Avail: NTIS HC A04/MF A01 CSCL 04/1

Using observations of the scintillations of beacons from synchronous satellites, a high latitude model of scintillation excursion is being developed. Phase 1 of the development has been completed and is described in this report. Several years of continuous recordings taken at Narssarssuaq, Greenland, Goose Bay, Labrador, and Sagamore Hill, Massachusetts, were reduced. The data base consists of values of 15-min scintillation excursions in dB at 137 MHz. Equations are developed which yield scintillations at this frequency as a function of local time, magnetic index, solar flux, and month of the year. The concept is to predict, at sub-auroral and auroral latitudes, scintillation at this frequency and at higher frequencies. The aim is to give to users an indication of expected scintillation excursion when one predicts magnetic activity and solar radio flux. The equations developed have been checked with one additional set of observations and are being checked with additional data. Phase 2 of this model will incorporate geometrical terms to take account of the propagation angle of the observer vis-a-vis the irregularities and will allow for frequency dependence to be ascertained. In addition, it is expected in Phase 2 to validate the model with additional sets of data, extending the model to auroral latitudes greater than 63 deg. and to polar latitudes.
Author (GRA)

N77-27867# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
EARTHQUAKE DATA FILE SUMMARY
Herbert Meyers and Carl A. VonHake May 1976 59 p refs
(PB-265445/7; NOAA-77030214) Avail: NTIS HC A04/MF A01 CSCL 08K

The Earthquake Data File is a magnetic tape file of earthquake origin times, locations, magnitudes, and related information on effects that have been compiled from many sources. It is a useful tool for providing searches of the seismicity of selected regions, for preparing lists of earthquakes of given characteristics (large magnitude, intensity, tsunami, etc.) for plotting maps, and for making statistical studies. GRA

N77-31698*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MEASUREMENTS AND ANALYSIS OF OZONE VARIATIONS
In its Chlorofluoromethanes and the Stratosphere Aug. 1977 p 51-88
Avail: NTIS HC A12/MF A01 CSCL 04A

The techniques that were used for total ozone and vertical distribution including measurement accuracy and precision are briefly discussed. A description of data availability is provided, and sample total ozone and stratospheric data are presented to illustrate the trends that were deduced from the data. Author

N77-31701# Teledyne Geotechnical, Alexandria, Va.
SEISMIC DATA ANALYSIS CENTER Final Technical Report
Royal A. Hartenberger 1 Nov. 1976 55 p
(Contract F08606-76-C-0004; ARPA Order 1620)
(AD-A040301; SDAC-TR-76-13) Avail: NTIS HC A04/MF A01 CSCL 08/11

The Alexandria Laboratories Division of Teledyne Geotech operated the Seismic Data Analysis Center (SDAC) during the fifteen (15) month period beginning 1 July 1975 and ending

30 September 1976. The objectives of the work were: (1) to operate, program, and maintain real-time and batch processors; (2) to provide services to other government agencies and VELA participants; (3) to conduct research in seismology; and (4) to develop systems to control and process seismic inforamtion generated by remote stations in the Expanded VELA Seismic Network. Scientists completed 18 technical reports, 10 technical memoranda and two special reports on various subjects in seismology. The more important scientific results produced by these studies are: the determination that the Norwegian Seismic Array contains many redundant sensors; the conclusion that the difference between magnitude based on S waves and magnitude based on Rayleigh waves is a discriminant between worldwide earthquakes and underground explosions at NTS and Amchitka; the confirmation that the Ms versus mb source discriminant fails for certain earthquakes in Tibet; the observation that both simple and complex earthquakes originate within small areas on the Kamchatka Peninsula; the hypothesis that differences in attenuation account for the differences in teleseismic event magnitude observed in the western and eastern United States and a study which supports the hypothesis using data from several underground nuclear explosions. In the area of network development, a new software system was installed which detects amplitudes above a prescribed level on seismograms recorded by the VELA network. GRA

N77-32878# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
DATA DESCRIPTION AND QUALITY ASSESSMENT OF IONOSPHERIC ELECTRON DENSITY PROFILES FOR ARPA MODELING PROJECT
Raymond O. Conkright Mar. 1977 89 p
(PB-269620/1; NOAA-TR-EDS-16; NGSDC-1; NOAA-77050403) Avail: NTIS HC A04/MF A01 CSCL 04A

The automated method used to produce electron density profiles from ionograms is described and an assessment of the resulting data base is given. A large data base of about 30,000 profiles was required for an ionospheric modeling project. This motivated a search for an automated method of producing profiles. The automated method used is fully described, the resulting data are given a quality grade, and the noon and midnight profiles are presented. GRA

N78-10629*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AOIPS DATA BASE MANAGEMENT SYSTEMS SUPPORT FOR GARP DATA SETS Technical Report, Oct. 1976 - Sep. 1977
J. P. Gary Oct. 1977 86 p refs
(NASA-TM-78042) Avail: NTIS HC A05/MF A01 CSCL 04A

A data base management system is identified, developed to provide flexible access to data sets produced by GARP during its data systems tests. The content and coverage of the data base are defined and a computer-aided, interactive information storage and retrieval system, implemented to facilitate access to user specified data subsets, is described. The computer programs developed to provide the capability were implemented on the highly interactive, minicomputer-based AOIPS and are referred to as the data retrieval system (DRS). Implemented as a user interactive but menu guided system, the DRS permits users to inventory the data tape library and create duplicate or subset data sets based on a user selected window defined by time and latitude/longitude boundaries. The DRS permits users to select, display, or produce formatted hard copy of individual data items contained within the data records. Author

N78-10660# Army Electronics Command, White Sands Missile Range, N. Mex. Atmospheric Sciences Lab.
IONOSPHERIC D-REGION ELECTRON DENSITY DATA AVAILABILITY
Robert Rubio Nov. 1977 18 p refs
(AD-A049275; ECOM-DR-77-6) Avail: NTIS HC A02/MF A01 CSCL 20/14

A survey of the availability of ionospheric D-region electron density data has been completed and is reported here. A table which lists 45 world locations where lower ionospheric electron density profiles have been obtained is included. The availability of electron density data is interpreted in terms of the general global distribution and in terms of both intermediate and long-path high frequency (3 to 30 MHz) Army communications channels. World maps are also included which serve to illustrate localities where D-region data have been recorded and world sections and paths where high frequency communications channels are currently active. Author (GRA)

N78-21094*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
USER'S GUIDE TO THE NIMBUS-4 BACKSCATTER ULTRAVIOLET EXPERIMENT DATA SETS
Barbara E. Lowrey Jan. 1978 96 p
(Contract NAS5-23854)
(NASA-TM-79069) Avail: NTIS HC A05/MF A01 CSCL 04A

The first year's data from the Nimbus 4 backscatter ultraviolet (BUV) experiment have been archived in the National Space Science Data Center (NSSDC). Backscattered radiances in the ultraviolet measured by the satellite were used to compute the global total ozone for the period April 1970 - April 1971. The data sets now in the NSSDC are the results obtained by the Ozone Processing Team, which has processed the data with the purpose of determining the best quality of the data. There are four basic sets of data available in the NSSDC representing various stages in processing. The primary data base contains organized and cleaned data in telemetry units. The radiance data has had most of the engineering calibrations performed. The detailed total ozone data is the result of computations to obtain the total ozone; the Compressed Total Ozone data is a convenient condensation of the detailed total ozone. Product data sets are also included. Author

N78-22062# Computer Sciences Corp., Arlington, Va.
ANALYSIS OF A WORLDWIDE STRONG MOTION DATA SAMPLE TO DEVELOP AN IMPROVED CORRELATION BETWEEN PEAK ACCELERATION, SEISMIC INTENSITY AND OTHER PHYSICAL PARAMETERS
J. R. Murphy and L. J. OBrien Jan. 1978 104 p refs
(Contract AT(49-24)-0362)
(PB-278361/3; NUREG-0402) Avail: NTIS HC A06/MF A01 CSCL 08K

A data base consisting of nearly 1600 accelerograms was assembled from the Western U.S., Japan, Southern Europe, and New Guinea. Statistical analysis of the accelerograms led to an equation in which maximum acceleration is a function of intensity, magnitude, and epicentral distance. Using both theoretical models and specific examples, variations in site ground motion responses were shown to be dependent on the thickness of the alluvium beneath the recording station. GRA

N78-28724# General Electric Co., Santa Barbara, Calif.
REACTION RATE DATA, NUMBER 60: RESUME OF FISCAL YEAR DNA-SPONSORED CHEMISTRY/PHYSICS REACTION RATE RESEARCH PROGRAMS
Oct. 1977 11 p
(Contract DNA001-75-C-0023)
(AD-A053677) Avail: NTIS HC A02/MF A01 CSCL 07/4

The following topics are discussed: (1) reaction rates essential to propagation; (2) theoretical investigations of ionizing mechanisms in the upper atmosphere; (3) atomic and molecular physics of IR emissions; and (4) IR phenomenology and optical code data base. GRA

N79-10657# Stanford Research Inst., Menlo Park, Calif.
DEVELOPMENT OF A VERTICAL MIXING DATA BASE IN THE SAN FRANCISCO BAY AND DELTA REGION, VOLUME 1: MAIN REPORT Final Report
P. B. Russell Oct. 1977 44 p refs
(Contract ARB-A6-066-80)
(PB-282455/5; ARB-R-A6-066-80-77-74-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 04A

A network of 13 sodars (acoustic radars) was operated from mid-August to early November 1976. Ancillary measurements of temperature and humidity profiles, haze and cloud layering, and 10 m winds were made by airplane, lidar and anemometer. Techniques of filming and manual digitization were developed to convert the continuous sodar data to hourly digital parameters describing mixing depth and nearsurface echo type (a stability indicator). The sodar-inferred mixing depths were compared to those inferred from the ancillary measurements. These and previous tests show good overall agreement and demonstrate that sodar measurements compare very favorably with alternate techniques for determining mixing depth in the Bay Area. To illustrate the use of the data, time-dependent maps of mixing depth are derived for a two-day period. GRA

N79-10880# Stanford Research Inst., Menlo Park, Calif.
DEVELOPMENT OF A VERTICAL MIXING DATA BASE IN THE SAN FRANCISCO BAY AND DELTA REGION, VOLUME 2: DATA APPENDICES Final Report
P. B. Russell Oct. 1977 118 p 2 Vol.
(Contract ARB-A6-066-RO)
(PB-282455/3; ARB-R-A6-066-80-77-75-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 04A

Data Appendices includes the digitized sodar, airplane, and wind data. The sodar and wind data are also available on computer cards. GRA

N79-12020 Purdue Univ., Lafayette, Ind.
STANDARDIZATION OF CELL SIZE FOR ENVIRONMENTAL GEOLOGY DATA BASE AND GENERATION OF DECISION MAKING CRITERIA FOR LAND USE PLANNING Ph.D. Thesis
Syed Eqbal Hasan 1978 295 p
Avail: Univ. Microfilms Order No. 7821453

Continued increase in world population has resulted in rapid urbanization throughout the world. Traditional land use planning is considered lacking in the sense that it usually disregards or gives little consideration to the physical aspects of the land. A computerized data base is developed for the southeastern part of Boone county, Indiana, using grid cells for data registration. Choice of cell size for data digitization is analyzed. A set of decision-making criteria is evolved for most of the common types of land use. These criteria are based on engineering geologic judgement and take into account the input from experts in disciplines involving land use. The procedures adopted for data registration and computer modelling are presented. The need to improve computer software for more efficient data processing is indicated. Dissert. Abstr.

N79-12040# Air Force Geophysics Lab., Hanscom AFB, Mass.
VARIABILITY OF THE LOWER THERMOSPHERE DETERMINED FROM SATELLITE ACCELEROMETER DATA
Frank A. Marcos, Robert E. McInerney, and Robert W. Fioretti 25 May 1978 47 p refs
(AD-A058982; AFGL-TR-78-0134; AFGL-ERP-633) Avail: NTIS HC A03/MF A01 CSCL 04/1

An extensive atmospheric density data base has been developed using accelerometer results from four low altitude satellites. The altitude range of the data is from 250 km down to as low as 140 km, with latitude coverage from 90 N to 90 S and local time periods that cover several 24-hr cycles. The data were obtained over a wide range of geomagnetic activity conditions. Solar radiation, as indicated by the 10.7-cm flux, was generally very low. Hence the data base applies mainly to solar minimum conditions. A description of the satellites, the accelerometer experiment, and the data base is given. Density variability is statistically analyzed in relation to selected atmospheric models. Particular attention is given to deviations from a normal distribution. Frequency distribitons of the data are described in terms of the mean value and the second, third, and fourth moments about the mean. This provides a more accurate description of extreme variations. The statistical properties of atmospheric variability are analyzed as a function of geomagnetic activity, latitude, altitude, and local time to develop a quantitative knowledge of unmodeled density variations. The results show that these accelerometer data will permit significant improvement in understanding the variations in the lower thermospheric density. GRA

N79-13010# Computer Corp. of America, Cambridge, Mass.
PROGRAM DESIGN FOR SWF-D: THE SIGNAL WAVEFORM FILE DEMON
Donald E. Eastlake, III and Joanne Z. Settley 30 Jun. 1978 38 p refs
(Contract N00039-78-C-0248; ARPA Order 3175)
(AD-A058532; CCA-78-10) Avail: NTIS HC A03/MF A01 CSCL 08/11

The seismic data activity sponsored by the Nuclear Monitoring Research Office (NMRO) involves the collection, storage and processing of seismic waveform information as measured by instruments installed throughout the world. The data activity is intended to assist seismologists in exploring techniques for the detection of seismic events, for pinpointing their location, and for recognizing the causes of these events. Author (GRA)

N79-14080# Air Force Geophysics Lab., Hanscom AFB, Mass.
ABOUT THE DEVELOPMENT OF A SECOND GENERATION ATMOSPHERIC SAMPLER CONTROL AND DATA SYSTEM: SCADS-2 Final Report
Robert H. Cordella, Jr. 16 Mar. 1978 240 p refs
(AD-A060062; AFGL-TR-78-0065; AFGL-IP-264) Avail: NTIS HC A11/MF A01 CSCL 04/1

This report documents the development of an atmospheric sampling control and data acquisition system (SCADS) for the Department of Energy's high-altitude, balloon-borne monitoring program. The period documented spans 5 calendar years ending with 1977. Sources for technical information are referenced. Author (GRA)

N79-15507# National Oceanic and Atmospheric Administration, Boulder, Colo.
IONOSPHERIC D-REGION PROFILE DATA BASE. A COLLECTION OF COMPUTER-ACCESSIBLE EXPERIMENTAL PROFILES OF THE D AND LOWER E REGIONS
L. F. McNamara (Ionospheric Prediction Service, Sydney) Aug. 1978 35 p refs
(PB-287867/6; UAG-67) Avail: NTIS HC A03/MF A01 CSCL 04A

A collection of some 700 experimental electron density profiles of the D and lower E regions of the ionosphere was digitized and made computer-retrievable. The collection includes most of the profiles published in the journal or report literature. The data are available in the form of three computer files that give the conditions under which each profile was obtained, a full list of references from which the experimental data were extracted, and the digitized profiles themselves. GRA

N79-16680# Defence Research Establishment Pacific, Victoria (British Columbia).
THE DREP OMIS GEOMAGNETIC MICROPULSATION DATA RECORDS, 1969 TO 1974: THEIR CONTENT AND INTERPRETATION
J. A. Shand Apr. 1978 19 p
(AD-A061738; DREP-TM-78) Avail: NTIS HC A02/MF A01 CSCL 08/14

A set of 25 digital magnetic tapes contain the better part of five years: single-component quantitative geomagnetic micropulsation information recorded at a quiet site in Southern Alberta. These tapes, derived from the original records, now exist in a standard, readable format. Author (GRA)

N79-25029# Texas Instruments, Inc., Dallas. Equipment Group.
APPLICATION OF RINGDAL'S METHOD TO UNBIASED MEASUREMENT OF THE Ms-mb RELATIONSHIP
Alan C. Strauss 31 Aug. 1978 50 p refs
(Contract F08606-77-C-0004; ARPA Order 2551)
(AD-A066712; TI-ALEX(01)-TR-78-03, TR-15) Avail: NTIS HC A03/MF A01 CSCL 17/10

Ringdal's maximum likelihood method of removing magnitude bias was tested by removing the apparent bias of surface wave magnitude estimates. Bias removal was convincingly demonstrated by comparing maximum likelihood estimates of M sub s obtained by a single sensor to those obtained by an array at the Alaskan

Long Period Array (ALPA) site. Since the beamformed array has a lower detection threshold than the single-sensor reference site, it can serve as the standard by which to judge whether positive magnitude bias has been removed from the reference site surface wave magnitude estimates. The results of this test indicate that below the 90 percent detection threshold of the reference site, positive magnitude bias becomes a significant factor in surface wave magnitude estimates. Comparison with beamformed array data indicates that application of Ringdal's method accurately removes this bias down to approximately the reference site 25 percent detection threshold. Below this point, the method over-corrects the magnitude estimates, resulting in abnormally low values. GRA

N79-28634# Computer Corp. of America, Cambridge, Mass.
REPORT ON THE IMPLEMENTATION AND TEST OF SWF-D: THE SIGNAL WAVEFORM FILE DEMON
Joanne Z. Settley Jan. 1979 157 p refs
(Contract N00039-78-C-0246; ARPA Order 3540)
(AD-A066137; CCA-79-09) Avail: NTIS HC A08/MF A01 CSCL 17/10

For a number of years, the Nuclear Monitoring Research Office (NMRO) has sponsored the development of tools and techniques which have been of value in advancing seismological research. But only with the development of large-database techniques has it been possible for seismologists to do meaningful analytical work over the vast quantities of data which represent seismic activity. Instruments, installed world-wide, detect, acquire and measure seismic readings. And computers are employed in virtually every aspect of collecting, analyzing, processing and storing seismic waveform data. At CCA, the Data computer (MARILL and STERN) was developed under ARPA funding to function as a first-of-a-kind network data utility for the support of very large databases, allowing shared remote access by heterogeneous computers in a network environment. The Datacomputer thus provides the facility required to store online the very large amounts of seismic data being collected. GRA

N79-28823*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN EVOLUTIONARY APPROACH TO THE GROUP ANALYSIS OF GLOBAL GEOPHYSICAL DATA
James I. Vette Feb. 1979 53 p refs
(NASA-TM-80344; NSSDC/WDC-A-R/S-79-02) Avail: NTIS HC A04/MF A01 CSCL 08G

The coordinated data analysis that developed within the International Magnetospheric Study is presented. A tracing of its development along with various activities taking place within this framework are reported. M.M.M.

N79-28836# Naval Research Lab., Washington, D. C. Optical Sciences Div.
HIGH-RESOLUTION ATMOSPHERIC-TRANSMISSION SPECTRA FROM 5 TO 3 MICROMETERS Interim Report
Kenneth M. Haught 9 Mar. 1979 17 p refs
(NRL Proj. R05-31; NRL Proj. S01-82A)
(AD-A068468; AD-E000291; NRL-8297) Avail: NTIS HC A02/MF A01 CSCL 04/1

This report describes the field-measurement and data-reduction procedures used to obtain longpath, absolute-transmission spectra in the 5 to 3 micrometers atmoshperic window. These measurements were carried out under a wide range of meteorological conditions. Key results of these measurements have been assembled into a data base of high-resolution atmospheric-transmission spectra which is now available on digital magnetic tape. Author (GRA)

N80-14617# Midwest Research Inst., Golden, Colo.
INSOLATION MODELS, DATA AND ALGORITHMS Annual Report, 1978
R. L. Hulstrom Dec. 1978 83 p refs
(Contract EG-77-C-01-4042)
(SERI/TR-36-110) Avail: NTIS HC A05/MF A01

Operational computer models for thermal (broadband) and spectral insolation were developed along with a data base (SOLMET) for the U.S. geographical distribution of thermal insolation. Preliminary research measurements of the thermal insolation on tilted surfaces were performed and a complete design concept of advanced instrumentation to measure automatically the insolation on 37 tilted surfaces at various orientations was developed. DOE

N80-22918# Battelle Pacific Northwest Labs., Richland, Wash.
SEISMIC DATA CATALOG AND ASSOCIATED GRAPHICAL CAPABILITIES
T. N. Bishop, H. P. Foote, and S. C. Blair Nov. 1979 55 p refs
(Contract EY-76-C-06-1830)
(PNL-2893) Avail: NTIS HC A04/MF A01

An extensive data base of compiled seismic data is described along with useful and unique computer techniques for analysis and display of the data. Software associated with the data base include programs for editing earthquake files, sorting files with respect to time, location, or magnitude, selecting data by use of various parameters and merging files. The desired file may then be listed or displayed graphically. From the data analysis software, an accurate and comprehensive earthquake catalog for the Pacific Northwest was created. Graphic displays can plot two and three dimensional epicenter or hypocenter information. Magnitude and/or depth information can be represented on two-dimensional plots by using color of symbol size. Plots can be produced using a variety of map projections and at a specified scale. The capability allows the use of any desired map as a base map for the display of earthquake data. Dissert. Abstr.

N80-27891# Eidgenoessische Technische Hochschule, Zurich (Switzerland). Inst. of Geophysics.
THE EUROPEAN-MEDITERRANEAN SEISMOLOGICAL CENTRE (EMSC)
S. Mueller *In* ESA European Earthquake Prediction Program Mar. 1980 p 189-193 refs

Avail: NTIS HC A10/MF A01; ESA, Paris FF 80

The European-Mediterranean Seismological Center and its activities are described. The objectives of this data processing center are (1) to initiate a system for the rapid determination of European and Mediterranean epicenters and to transmit the results as needed, (2) to gather all seismological data necessary for the functioning of the center in a unified format directly amenable to calculation in order to promote processing, and (3) to exchange data with other data centers. Author (ESA)

N80-32019# Arizona Univ., Tucson. Dept. of Hydrology and Water Resources.
MEASUREMENT, PREDICTION, AND HAZARD EVALUATION OF EARTH FISSURES AND SUBSIDENCE, SOUTH-CENTRAL ARIZONA
James K. Boling, Jr., Michael C. Carpenter, N. M. Johnson, and S. N. Davis 1980 113 p refs
(Contract DI-14-34-0001-8003; OWRT Proj. A-092-ARIZ(1))
(PB80-183908; W80-05006) Avail: NTIS HC A06/MF A01 CSCL 08G

Earth fissuring and subsidence research in south central Arizona consisted of measurement of horizontal movements of earth fissures and mapping of erosional features and hazard evaluation of earth fissures. Records will form the data base for predictive models of subsidence and earth fissuring. Bimonthly horizontal strain measurements of fissures were made over a three year period at locations near Signal Peak, Picacho Mountains, and in Avra Valley. Fissures opened and closed repeatedly. They exhibited relatively smooth movement with occasional sudden jumps. Fissures closed during long dry periods and opened after high rainfall. GRA

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

A75-35428 # **Preliminary results from pilot aviation weather self-briefing experiments.** F. J. Steckbeck (U.S. Navy; FAA, Systems Research and Development Service, Washington, D.C.) and H. D. Milligan (FAA, National Aviation Facilities Experimental Center, Atlantic City, N.J.). In: Conference on Aerospace and Aeronautical Meteorology, 6th, El Paso, Tex., November 12-15, 1974, Preprints. Boston, Mass., American Meteorological Society, 1974, p. 418-425.

Results are reported for field experiments conducted to evaluate the efficacy of the Pilot Self-Briefing Terminals which have been proposed to provide weather information to general-aviation pilots. The project objectives and experimental plan are described, and the data flow for the live-data field experiments is illustrated. The primary briefing format is discussed in detail, and data samples are presented for the alphanumeric and graphic modes. The major problem encountered by pilots in the field experiments is shown to be the massive amount of data that had to be evaluated since the readouts provided regional weather forecasts. It is recommended that a grid form be used for the weather data in order to reduce the amount of data and the terminal occupancy time. F.G.M.

A76-11585 # **The basic data set, its processing and use (Massiv osnovnykh dannykh, ego obrabotka i ispol'zovanie).** Iu. M. Liberman (Leningradskii Gidrometeorologicheskii Institut, Leningrad, USSR). ***Meteorologiia i Gidrologiia,*** Aug. 1975, p. 92-97. 7 refs. In Russian.

The form and composition of data describing the global state of the atmosphere, collected as part of the GARP Basic Data Set Project (November 1969 and June 1970), are discussed. The classification of data according to its source and form for storage on magnetic tape in four formats of the Expanded Binary Coded Decimal Interchange Code (EBCDIC) is outlined, along with the computer-aided data processing method. C.K.D.

A76-18879 # **The first ten years of activity of the Hydrology Section (Les dix premières années d'activités de la section d'hydrologie).** F. Bultot, G. L. Dupriez, and J. Dumoulin. *Institut Royal Météorologique de Belgique, Publications, Série A,* no. 91, 1975, p. 67-81. 32 refs. In French.

The article reviews the functions of the Hydrology Section, the principal equipment used by the Hydrology Section, and the technical information service of the section. The use of rain gages and the handling of data, measurements of precipitation on sloping basins, prediction of rain intercepted by forest vegetation, and evapotranspiration patterns are discussed. A hydrological model amenable to daily updating and applicable to a sloping basin of intermediate extent is demonstrated. The section work plan for the coming decade is outlined. R.D.V.

A76-30828 **On interannual variations of angular momentum and zonal kinetic energy in the atmosphere.** N. E. Gaut, M.-F. Wu, R. D. Rosen (Environmental Research and Technology, Inc., Concord, Mass.), and J. P. Peixoto (Lisboa, Universidade, Lisbon, Portugal; MIT, Cambridge, Mass.). *Tellus,* vol. 28, no. 2, 1976, p. 122-137. 13 refs. U.S. Department of Transportation Contract No. OS-20217; NSF Grants No. GA-36021X; No. DES-75-02919; No. OCD-75-19625.

Interannual changes in various quantities involved in the atmospheric balances of angular momentum and zonal kinetic energy for the Northern Hemisphere have been analyzed for a five-year period. The data consist of daily upper-air measurements of the horizontal wind field taken from a hemispheric network of over 700 stations. Results are presented for the most part in the form of meridional cross-sections through the atmosphere and profiles of vertical averages of the quantities studied. The fields of quantities dependent on the mean meridional flow show large year-to-year fluctuations, though the fact that such fields are difficult to measure accurately must be borne in mind. By comparison, the mean zonal flow field and the horizontal transient eddy momentum flux are relatively stable. However, variations that they do display may be of considerable interest for certain purposes. (Author)

A76-37029 # **Wind shear program and status.** L. Langwell (FAA, Washington, D.C.). *American Institute of Aeronautics and Astronautics, Fluid and Plasma Dynamics Conference, 9th, San Diego, Calif., July 14-16, 1976, Paper 76-386.* 9 p.

The wind shear program of the FAA, which is designed to alleviate the hazards of wind shear in the terminal area, is described. The program investigates solutions to wind shear hazards in three categories: (1) through the use of ground-based sensors (gust front sensors, vertical probe sensors and glide slope scan sensors); (2) through the use of airborne sensor systems; and (3) by providing localized wind shear forecasts on a terminal by terminal basis. B.J.

A77-30306 **Preliminary results of a statistical long-range forecasting attempt.** E. W. Wahl (Wisconsin, University, Madison, Wis.). *Monthly Weather Review,* vol. 105, Apr. 1977, p. 529-535. 8 refs. NSF Grant No. GI-29731.

By statistical methods an attempt was made to obtain long-range predictions of large-scale circulation parameters for the Northern Hemisphere. Using lag relationships going back in time up to 50 months and attempting to predict coefficients of monthly sea level pressure eigenvectors, statistically significant results could be obtained in a set of independent data. (Author)

A78-13680 * # **Algorithm for inferring wind stress from Seasat-A.** W. L. Jones, L. C. Schroeder (NASA, Langley Research Center, Hampton, Va.), and F. J. Wentz (Frank J. Wentz and Associates, Cambridge, Mass.). In: Satellite applications to marine technology; Conference, New Orleans, La., November 15-17, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 255-263. 15 refs. (AIAA 77-1614)

A78-17325 * **Water vapor in the lower stratosphere measured from aircraft flight.** E. Hilsenrath, B. Guenther (NASA, Goddard Space Flight Center, Atmospheric and Hydrospheric Applications Div., Greenbelt, Md.), and P. Dunn (EG & G Washington Analytical Services Center, Inc., Riverdale, Md.). *Journal of Geophysical Research,* vol. 82, Nov. 20, 1977, p. 5453-5458. 12 refs. Research supported by the U.S. Department of Transportation.

Water vapor in the lower stratosphere was measured in situ by two aluminum oxide hygrometers mounted on the nose of an RB57 aircraft. Data were taken nearly continuously from January to May 1974 from an altitude of approximately 11-19 km as the aircraft flew between 70 deg N and 50 deg S over the land areas in the Western Hemisphere. Pseudomeridional cross sections of water vapor and temperature were derived from the flight data and show mixing ratios predominantly between 2 and 4 microg/g with an extreme range of 1-8 microg/g. Measurement precision was estimated by comparing the simultaneously measured values from the two flight hygrometer systems. Accuracy was estimated to be about + or - 40% at 19 km. A height-averaged latitudinal cross section of water vapor indicates symmetry of wet and dry zones. This cross section is compared with other aircraft measurements and relates to meridional circulation models. (Author)

A78-32201 **The interannual variability of the ocean-atmosphere system.** E. R. Reiter (Colorado State University, Fort Collins, Colo.). *Journal of the Atmospheric Sciences,* vol. 35, Mar. 1978, p. 349-370. 47 refs. NSF Grant No. ATM-76-21017; Contract No. EY-76-S-03-1340.

Evidence is derived from observational data that the trade wind circulations in both hemispheres over the Pacific are related to the sea surface temperature (SST) anomalies in the North Pacific. The equatorward component of the surface trade winds leads the North Pacific SST anomalies by approximately 20 months, equivalent to the half-rotation time of the Pacific gyre. Long-term trends in the Pacific trade wind regime appear to have an influence on hemispheric and global mean temperatures. The trade wind anomalies also seem to be tied to meridional atmospheric pressure- and temperature-gradient anomalies which, in turn, appear to respond to anomalies in the meridional SST gradients. Thus a closed feedback loop is demonstrated, in which SST anomalies in the North Pacific generate trade wind anomalies which promote the development of North Pacific SST anomalies of opposite sign. The trade wind surges also are related to El Nino through a feedback involving the hydrological cycle and upwelling of cold water forced by Ekman pumping. (Author)

A79-16188 * **NASA and the U.S. climate program - A problem in data management.** J. J. Quann (NASA, Goddard Space Flight Center, Greenbelt, Md.). In: National Computer Conference, Anaheim, Calif., June 5-8, 1978, Proceedings.
Montvale, N.J., AFIPS Press, 1978, p. 175-179.

NASA's contribution to the total data base for the National Climate Plan will be to produce climate data sets from its experimental space observing systems and to maximize the value of these data for climate analysis and prediction. Validated data sets will be provided to NOAA for inclusion into their overall diagnostic data base. NASA data management for the Climate Plan will involve: (1) cataloging and retrieval of large integrated and distributed data sets upon user demand, and (2) the storage equivalent of 100,000 digital data tapes. It will be the largest, most complex data system ever developed by NASA. B.J.

A79-17182 **High-resolution atmospheric transmittance and radiance - HITRAN and the data compilation.** L. S. Rothman (USAF, Geophysics Laboratory, Bedford, Mass.). In: Optical properties of the atmosphere; Proceedings of the Seminar, Washington, D.C., March 30, 31, 1978. Bellingham, Wash., Society of Photo-Optical Instrumentation Engineers, 1978, p. 2-5. 13 refs.

The status and updating of the AFGL Atmospheric Absorption Line Parameter Compilation is discussed. This data base and its concomitant Trace Gas Compilation form the basis of HITRAN, the overall program for calculating high resolution transmittance and radiance through atmospheric paths. A new code has been developed which calculates absorption coefficients at equally spaced wavenumber intervals through multilayer atmospheric paths with a great deal of computational advantages realized. Examples of transmittance and radiance calculations are presented. (Author)

A79-22607 # **Operational and experimental use of SMS/GOES digital satellite data.** M. P. Waters, III (NOAA, National Environmental Satellite Service, Washington, D.C.). In: International Symposium on Remote Sensing of Environment, 12th, Manila, Philippines, April 20-26, 1978, Proceedings. Volume 2.
Ann Arbor, Mich., Environmental Research Institute of Michigan, 1978, p. 1529-1544. 11 refs.

The National Environmental Satellite Service (NESS) currently operates two environmental satellite systems. These are polar-orbiting NOAA-5 (a sun-synchronous satellite providing twice-daily global coverage) and the Geostationary Operational Environmental Satellites (GOES). The two GOES satellites provide environmental data of the earth's disk facing each satellite at periodic intervals. The environmental data from both satellite systems are routinely processed by the NESS into a variety of quantitative and image products, which are then distributed to users. The GOES views the earth's disk through the Visible and Infrared Spin-Scan Radiometer (VISSR) instruments. The operational and experimental uses of the digital VISSR data at the NESS from the GOES satellites are discussed. Attention is given to the VISSR data base, landmark registration/geographic registration, gridding, cloud-motion wind vector estimates, a sea surface thermal analysis, the analysis of a hurricane rain potential, fruit-vegetable crop freeze warnings, solar insolation estimates, and cloud-top height analysis. G.R.

A79-24584 # **Allocation and search algorithms for an operative system of objective analysis of meteorological fields (Sortier- und Suchalgorithmen für ein operatives System objektiver Analysen meteorologischer Felder).** Ch. Vollbrecht and K. H. Stahnke-Jungheim (Meteorologischer Dienst, Zentrale Wetterdienststelle, Potsdam, East Germany). *Zeitschrift für Meteorologie*, vol. 28, no. 6, 1978, p. 344-351. 13 refs. In German.

The characteristics of algorithms required for the calculation of the value of a meteorological element at given lattice points on the basis of the given data is discussed. It is found that the currently known algorithms have certain disadvantages from the point of view of the ideal requirements. A description is presented of an improved algorithm of allocation and search for an operational analysis system. Calculations on the basis of the new algorithm require less computer time, and the programming requirements are also reduced. G.R.

A79-45204 **Solar radiation data in the southeastern United States.** E. A. Carter and B. B. Williams (Alabama, University, Huntsville, Ala.). In: Application of solar energy; Proceedings of the Third Southeastern Conference, Huntsville, Ala., April 17-19, 1978.
Huntsville, Ala., UAH Press, 1978, p. 31-42. 9 refs.

Proper selection of sites, sensors, data collection equipment, and correct installation and maintenance of equipment are necessary for meaningful solar radiation measurements. Some of these factors in reference to global, direct, and diffuse radiation are discussed briefly, and the relation of these measurements to tilt measurements is illustrated. The availability of solar radiation measurements in the southeastern United States is presented. The location of solar radiation sites, the data bank locations and format of data storage are given. (Author)

A80-25578 # **A merged satellite infrared and manually digitized radar product.** M. P. Waters, III and R. N. Green (NOAA, National Environmental Satellite Service, Camp Springs, Md.). In: Machine processing of remotely sensed data; Proceedings of the Fifth Annual Symposium, West Lafayette, Ind., June 27-29, 1979.
New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 183-191.

This paper describes an automated technique which uses digital data from a geosynchronous environmental satellite and conventional meteorological data mapped to the satellite's viewing projection. The technique produces a cloud-top height display with coincident manually digitized radar. (Author)

A80-33034 **GATE cloud - sub cloud layer interactions examined using a three-dimensional cumulus model.** J. Simpson and G. van Helvoirt (Virginia, University, Charlottesville, Va.). *Beiträge zur Physik der Atmosphäre*, vol. 53, Feb. 1980, p. 106-134. 62 refs. NSF Grant No. ATM-74-21701-A02.

The paper examines the interactions between the cloud and subcloud layer in the GARP Atlantic Tropical Experiment by means of a three-dimensional cumulus model developed at the University of Wisconsin. The model is applied to two size classes of cumuli (congestus and cumulonimbus) by the use of two different sizes of initial perturbations with the observed thermodynamic sounding and several variations of the observed vertical wind profile. It is found that the model clouds are realistic in many respects except for deficient cloud lifetimes and precipitation. M.E.P.

A80-39864 **A precipitation forecast verification program.** J. M. Horodeck and R. Y. Hirano (NOAA, National Meteorological Center, Camp Springs, Md.). In: Conference on Numerical Weather Prediction, 4th, Silver Spring, Md., October 29-November 1, 1979, Preprints. Boston, American Meteorological Society, 1979, p. 138-143.

A precipitation forecast verification system that would adequately describe the strengths and weaknesses of operational numerical models is being developed by the National Meteorological Center with a view to improving existing precipitation models. To meet the requirements for reasonably current verification, the maximum number of stations in the data base will be reduced to less than two hundred. Precipitation verification statistics, such as threat scores and bias, are supplemented with analyses and other statistics designed to evaluate model forecasts used as guidance within the limitation of the station or point observation system. Analysis of model performance is illustrated by examples. V.L.

A80-39881 **Characteristics of FGGE level IIIa data sets from the NMC global data assimilation system.** In: Conference on Numerical Weather Prediction, 4th, Silver Spring, Md., October 29-November 1, 1979, Preprints. Boston, American Meteorological Society, 1979, p. 331-334.

The principal characteristics of the data assimilation system (DAS) being used by NMC for producing its FGGE Level III data sets are described. The components of the DAS are outlined including a numerical prediction model, objective analysis model, and objective analysis method. Consideration is given to a typical data base, monitoring of the performance of the system, and future plans. V.T.

A80-41504 # **A first look at the summer MONEX GOES satellite data.** E. A. Smith and T. H. Vonder Haar (Colorado State University, Fort Collins, Colo.). *American Institute of Aeronautics and Astronautics, Thermophysics Conference, 15th, Snowmass, Colo., July 14-16, 1980, Paper 80-1548.* 17 p. 40 refs. NSF Grant No. ATM-78-20375.

During the 1979 spring and summer, the Summer Monsoon Experiment (Summer MONEX) took place to examine the development and maintenance of the summer Indian monsoon circulation and rainfall. The field phase of this experiment consisted of the deployment of a number of meteorological instruments mounted on aircraft, satellites, ships and conventional surface platforms, and designed to obtain a detailed atmospheric and hydrological data set of a complete summer monsoon cycle. This study examines: (1) the problem of using aircraft mounted, broadband flux radiometers (shortwave) to calibrate narrow solid angle-narrow band scanning radiometers on board the GOES-1 geosynchronous satellite; (2) the determination of filtered radiance to broadband flux transformation models so as to utilize satellite measurements to monitor the large scale heat exchange process during a monsoon cycle. (Author)

N76-16186# National Oceanic and Atmospheric Administration, Washington, D.C. Center for Experiment Design and Data Analysis.
WATER-VAPOR AND MASS DIVERGENCE COMPUTATIONS BASED ON BOMEX AIRCRAFT AND RAWINSONDE DATA: A COMPARISON
Robert W. Reeves Dec. 1974 28 p refs
(NOAA-TM-EDS-BOMAP-13) Avail: NTIS HC $3.75

Water-vapor and mass divergences were computed from aircraft and rawinsonde data collected during the Barbados Oceanographic and Meteorological Experiment (BOMEX) in 1969. The contribution to the water-vapor flux divergence by horizontal subgrid-scale eddies was found to be unimportant during undisturbed weather conditions. Correlation coefficients and rms differences between measurements of the same horizontal wind derivatives by different systems are discussed. Results indicate that divergence computations based on data from a single four-aircraft mission are comparable in accuracy to those based on rawinsonde data averaged over four release times and 50 mb. Author

N76-17046# World Meteorological Organization, Geneva (Switzerland).
THE STORAGE, CATALOGUING AND RETRIEVAL OF METEOROLOGICAL INFORMATION
J. M. Craddock 1974 250 p
(WMO-368; WWW-PLR-34) Avail: NTIS HC $7.50

The design of a computerized cataloging system for an international meteorological data bank is examined in considerable detail. Specific instructions and examples are provided. The general purpose cataloging and retrieval program is implemented in universal Fortran, for which a generalized flow diagram is given. The system flexibility allows both a low level comprehensive catalog and a high level selective catalog to be developed using the same retrieval language with upgrading of entries whenever resources permit. ESRO

N76-15784*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IN-SITU WATER VAPOR MEASUREMENTS IN STRATOSPHERIC AIRCRAFT FLIGHTS Final Report
Ernest Hilsenrath and Bruce Guenther May 1975 51 p
Sponsored in part by DOT
(NASA-TM-X-72955; PB-244441/2) Avail: NTIS HC $4.50 CSCL 04B

An aluminum oxide hygrometer was flown on board the Climatic Impact Assessment Program RB-57 aircraft. The instrument was designed to measure ambient water vapor in-situ. It was mounted in the nose of the aircraft and data were recorded by the aircraft flight recorder system. Data from flights from January 1974 to May 1974 were processed and compiled to form a 500 point data base. From this data base, water vapor as a function of time, latitude, longitude, or altitude can be retrieved. The data from the LACATE comparison flights and the rocket plume penetration flights are presented. A pseudo-meridional cross section of water vapor between 40,000 feet and 80,000 feet from 50 degrees N to 50 degrees S latitudes was constructed. The cross section shows water vapor mixing ratios between one and nine micrograms per gram with hemispheric asymmetry of wet and dry regions. The wetter regions appear over the intertropical convergence zone and at mid to high latitudes. GRA

N76-24866# Mitre Corp., Bedford, Mass.
METEOROLOGICAL DATA BASE FOR 1974 AWACS-SID
B. N. Charles Oct. 1975 87 p refs
(Contract F19628-75-C-0001; AF Proj. 4110)
(AD-A018466; MTR-2990; ESD-TR-75-90) Avail: NTIS CSCL 04/2

Routine and special meteorological observations together with airborne refractometer observations were acquired as an improved weather data base for post-analyses of propagation during selected days of the 1974 AWACS SID. This paper describes these data and the methods used to derive detailed refractivity cross-sections for entry into a two-dimensional ray-tracing simulation. Author (GRA)

N76-28877# Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
A COMPARISON BETWEEN OBSERVED AND DEDUCED MEAN MONTHLY WINDS FROM 700 mb TO 200 mb Environmental Research Papers
Arthur J. Kantor 22 Jan. 1976 29 p
(AF Proj. 8624)
(AD-A021897; AFCRL-TR-76-0044; AFCRL-ERP-548) Avail: NTIS CSCL 04/2

Differences between mean monthly winds obtained from actual observations and geostrophic wind derived from mean monthly altitudes of constant-pressure surfaces are examined for January and July at four levels between 10,000 and 40,000 ft. Differences in speed for both east-west and north-south components are significantly and unexpectedly large. These results demonstrate the advantage of using observed winds rather than deduced values to provide climatic winds at altitudes between 10,000 and 40,000 ft. Modification of the existing system to include winds from actual observations wherever and whenever possible is recommended. Author (GRA)

N77-12847# Arizona Univ., Tucson. Lab. of Tree-Ring Research.

RECONSTRUCTION OF PAST CLIMATIC VARIABILITY Final Report, 30 Jun. 1972 - 30 Sep. 1975
Harold C. Fritts, T. J. Blasing, E. DeWitt, G. R. Lofgren, K. B. McDougall, D. J. Shatz, J. A. Sherwood, D. W. Stevens, C. L. Winter, and M. A. Wiseman 1 Mar. 1976 181 p refs
(Grant AF-AFOSR-2406-72; ARPA Order 2221)
(AD-A024276; AFOSR-76-0506TR) Avail: NTIS HC A09/MF A01 CSCL 04/2

The following are among the achievements made during the first 3 years of a 5-year project to reconstruct past climatic fluctuations in the Northern Hemisphere from variations in the growth rings of trees: (1) Growing international collaboration stimulated by this research effort; (2) Development of 127 high-quality tree-ring chronologies from North America and Europe; (3) The establishment of the International Tree-Ring Data Bank; (4) Evaluation of multivariate techniques for calibration and analysis; and (5) The selection of a revised data set for reconstructing North American climate. These results will be used to improve reconstructions of past climate and to expand them to eastern North America and Europe. GRA

N77-27804# Mission Research Corp., Santa Barbara, Calif.
A LOW ALTITUDE METEOROLOGICAL DATA BASE Technical Report, 13 Nov. 1975 - 12 Nov. 1976
S. L. Gutsche and K. S. Smith Aug. 1976 353 p refs
(Contract DNA001-76-C-0051)
(AD-A039063; MRC-N-255; DNA-4102T) Avail: NTIS HC A15/MF A01 CSCL 04/2

This document describes a meteorological data base of the Northern Hemisphere for atmospheric pressure levels up to 50 mb (about 20 km). The quantities provided are those which have proven to be useful in certain calculations of nuclear effects, such as modeling fireball rise and late time debris cloud movement. These quantities (provided at pressure levels of 850, 700, 500, 300, 200, 150, 100, and 50 mb) are: (1) mean easterly windspeed, (2) mean northerly windspeed, (3) vector standard deviation of windspeed, (4) temperature, (5) standard deviation of temperature, (6) dew point temperature, and (7) standard deviation of dew point temperature. The data is provided for all twelve months and seasons at five degree increments of latitude and longitude. How to access digital data appropriate for the four seasons and each month individually which is contained on magnetic computer tapes available through MRC or the DNA nuclear effects library, DASIAC, is described. In Appendix A, printed output from the data base for the seven quantities and eight pressure levels mentioned above is presented for the four seasons (output for each month would require more volumes). GRA

N78-14796*# Ecosystems International, Inc., Gambrills, Md.
WEATHER ASSESSMENT AND FORECASTING Technical Report, 1 - 30 Jun. 1977
Dec. 1977 134 p
(Contract NAS8-32408)
(NASA-CR-150488) Avail: NTIS HC A07/MF A01 CSCL 04B

Data management program activities centered around the analyses of selected far-term Office of Applications (OA) objectives, with the intent of determining if significant data-related problems would be encountered and if so what alternative solutions would be possible. Three far-term (1985 and beyond) OA objectives selected for analyses as having potential significant data problems were large-scale weather forecasting, local weather and severe storms forecasting, and global marine weather forecasting. An overview of general weather forecasting activities and their implications upon the ground based data system is provided. Selected topics were specifically oriented to the use of satellites. Author

N78-18524*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.
AS-BUILT DESIGN SPECIFICATION FOR THE DIGITAL DERIVATION OF DAILY AND MONTHLY DATA BASES FROM SYNOPTIC OBSERVATIONS OF TEMPERATURE AND PRECIPITATION FOR THE PEOPLE'S REPUBLIC OF CHINA
B. H. Jeun and G. L. Barger Dec. 1977 117 p
(Contract NAS9-15200)
(NASA-CR-151616; LEC-11680) Avail: NTIS HC A06/MF A01 CSCL 04B

A data base of synoptic meteorological information was compiled for the People's Republic of China, as an integral part of the Large Area Crop Inventory Experiment. A system description is provided, including hardware and software specifications, computation algorithms and an evaluation of output validity. Operations are also outlined, with emphasis placed on least squares interpolation. B.L.P.

N79-13888# Sandia Labs., Albuquerque, N. Mex.
GENERATION OF A TYPICAL METEOROLOGICAL YEAR
I. J. Hall, R. R. Prairie, H. E. Anderson, and E. C. Boes 1978 3 p Presented at Analysis for Solar Heating and Cooling, San Diego, Calif., 27 Jun. 1978
(Contract EY-76-C-04-0789)
(SAND-78-1096C; Conf-780639-1) Avail: NTIS HC A02/MF A01

A method for generating a typical meteorological year (TMY) was developed. The developed method was used to generate a TMY for each of the 26 SOLMET Rehabilitation Stations that have hourly data. The meteorological measures used to select the TMY were: dry bulb temperature; dew point temperature; wind velocity; and solar radiations on a horizontal surface-standard year corrected. Most SOLMET Stations have data available over a 23 year period beginning in 1953 and extending through 1975. The process used to select a TMY for a given station involves selecting, by statistical methods, one typical meteorological month (TMM) for each of the twelve calendar months from the 23 year period and catenating the twelve months to form a TMY. Thus, the TMY for each station consists of 12 months of actual meteorological data selected from the long term data base from that station, 23 years in most cases. A TMY at a given station could, for example, consist of January 1955, February 1966, March 1962, ... December 1973. DOE

N79-17425*# Army Aviation Research and Development Command, Fort Eustis, Va.
SUMMARY REPORT OF THE ICING COMMITTEE
Richard I. Adams *In* Tenn. Univ. Space Inst. Proc. of the 2nd Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Mar. 1978 p 193-199

Avail: NTIS HC A12/MF A01 CSCL 04B

Icing parameters have created problems and the problem areas that still exist today are presented. The problem areas include: (1) instrumentation; (2) test facilities; (3) weather forecasting of icing conditions; (4) meteorological design criteria; and (5) meteorological data. S.E.S.

N79-25881# Bern Univ. (Switzerland).
SIGNIFICANCE OF VARIOUS KINDS OF DATA FOR RECONSTRUCTION OF CLIMATE AND WEATHER EVOLUTION IN THE LAST CENTURIES [DIE BEDEUTUNG VERSCHIEDENER DATENTIPEN FUER DIE REKONSTRUKTION DES KLIMA-UND WITTERUNGSVERLAUFS DER LETETEN JAHRHUNDERTE]
Ch. Pfister, B. Messerli, P. Messerli, and H. J. Zumbuehl *In* Schweizerischen Meteorologischen Zentralanstalt Proc. of the 15th Intern. Meeting on Alpine Meteorology, Vol. 2 1979 p 47-48 refs In GERMAN

Avail: NTIS HC A04/MF A01

Historical data on weather and climate in Switzerland in the last three centuries were analyzed. The available data were divided into direct (old measurement series, noninstrumental weather records, climatologic data bank) and indirect materials (reproduction of glacier images and reports of glacier movements). The latter data are found to be in agreement with direct measurements of hygrometric and thermal indices. All data types indicate a cooling trend in the second half of the 18th century and three shorter cold periods within the same time. Author

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N79-28948# National Aviation Facilities Experimental Center, Atlantic City, N. J.
THE ANALYSIS OF NATIONAL TRANSPORTATION SAFETY BOARD SMALL SINGLE-ENGINE FIXED-WING AIRCRAFT ACCIDENT/INCIDENT REPORTS FOR THE POTENTIAL PRESENCE OF LOW-LEVEL WIND SHEAR Final Report
Jack J. Shrager May 1979 78 p refs
(AD-A069438; FAA-RD-79-3; FAA-NA-78-39) Avail: NTIS HC A05/MF A01 CSCL 04/2

The National Transportation Safety Board aircraft accident/incident data base covering the years 1964 through 1975 was screened to select those accidents involving single-engine aircraft of less than 12,500 pounds gross weight in which the potential of low-level wind shear as a factor could not be discounted. The software filtering resulted in identifying 2,469 small single-engine aircraft accident briefs which met the criteria for the possible presence of wind shear. A review of these briefs for the years 1964 through 1973 (excluding 1970, 1971, 1974, and 1975) further reduced this number to 304, which comprised the final data base used in this analysis. The presence of a low-level wind shear was a distinct possibility in 71 of these takeoff, approach, or landing accidents. Of this number, 48 involved mechanically (orographic or topographic) induced shears. In 23 of the cases, thunderstorms were reported or observed close to the aircraft flightpath. Author

N79-29763# Army Tropic Test Center APO, Miami 34004.
METHODOLOGY INVESTIGATION TEMPERATURE FREQUENCY DISTRIBUTION DATA ASSOCIATED WITH STRUCTURES ON OPEN EXPOSURE IN THE HUMID TROPICS Technical Note, Sep. 1973 - Oct. 1977
W. H. Portig Nov. 1978 41 p refs
(AD-A068634; USATTC-781101) Avail: NTIS HC A03/MF A01 CSCL 08/6

The US Army Tropic Test Center performed a study of Temperature Frequency Distribution Data based on data collected in the Canal Zone from September 1973 to October 1977. Objective was to compile and analyze frequency distributions of surface and induced air temperatures of structures on open exposure in the humid tropics. Data were collected for a number of different structures located in open areas in both the wet and dry seasons and in different orientations for selected structures. The highest temperature mesured was 192 F (89 C) on the metallic ceiling surface of an insulated MILVAN container. The highest roof surface temperature was 180 F (82 C) occurring on a CONEX container, and the highest enclosed air temperature was 142 F (61 C) occurring within an empty, noninsulated MILVAN. A MILVAN positioned with its long axis running north to south had higher internal air temperatures than an identical MILVAN positioned with its long axis running east to west. The mean temperature difference was 5 F (3 C) at 0900 hours and 4 F (2 C) at 1530 hours. GRA

N80-10734# Geo-Atmospherics Corp., Lincoln, Mass.
SENSITIVITY STUDY OF CFAS AND CFAR OBJECTIVE ANALYSIS TECHNIQUES Final Report
W. D. Mount, B. R. Fow, B. D. Mount, and J. F. Rapp Feb. 1979 276 p refs
(Contract DAEA18-76-C-0060)
(AD-A071452; ASL-CR-79-0060-1) Avail: NTIS HC A13/MF A01 CSCL 04/2

The Cloud/Fog Analysis System (CFAS) and the Cloud/Fog Application Routines (CFAR) were applied to weather data bases to determine their sensitivity to control parameters and to type, density, and distribution of observing stations. The data rich region of southeastern United States was selected and hourly aviation weather (Service A), six-hourly synoptic (Service C), and twelve-hourly radiosonde (RAOB) observations were collected for weather scenarios of interest to Army aviation. Computer methods were developed to process these data and convert them into a form suitable for CFAS. Objective analyses and output displays were generated using CFAS and CFAR, respectively, on such weather variables as sky cover, lowest cloud base, ceiling, visibility, significant present weather, and cloud obscuration to pilot's vision within discrete flight layers. Results, produced from large variations in the computer control parameters and density and distribution of stations, were used to modify the CFAS and CFAR to correct for detected errors and to fix the control parameters so that users are now relieved of that responsibility. This greatly simplifies the knowledge and experience required to execute CFAS. A large number of color-coded displays was generated to demonstrate feasibility, skill, and detail that is possible with an automated meteorological system in providing weather information tailored to Army user needs. GRA

N80-10739# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
METEOROLOGICAL DATA BASES AVAILABLE FOR THE UNITED STATES DEPARTMENT OF ENERGY OAK RIDGE RESERVATION
R. H. Strand and Charles W. Miller Dec. 1978 23 p refs
(Contract W-7405-eng-48)
(ORNL/TM-6358; ESD-Publ-1184) Avail: NTIS HC A02/MF A01

Solar radiation, precipitation, wind, and temperature phenomena are being monitored at two sites on the Oak Ridge Reservation-Oak Ridge and Walker Branch Watershed. For these two sites and two non active sites on the Reservation, height of the instruments, the available data for the parameters, and the temporal distribution of the data collected are described. Examples of data access and the contact for accessing the data are given. DOE

N80-12710# Midwest Research Inst., Golden, Colo.
WIND RESOURCE ANALYSIS
Donald M. Hardy Dec. 1978 20 p refs
(Contract EG-77-C-01-4042)
(SERI/TR-36-088) Avail: NTIS HC A02/MF A01

Modern atmosphere models of near-surface wind flow and primary data sets were developed from previous studies of national and regional wind resources. Because numerous assumptions are necessary to interpret available data in terms of wind energy potential, conclusions of previous studies differ considerably. The primary data sets and principal features of the models are discussed. DOE

N80-15729# Woods Hole Oceanographic Institution, Mass.
WOODS HOLE OCEANOGRAPHIC INSTITUTION COLLECTION OF CLIMATOLOGY AND AIR/SEA INTERACTION (CASI) DATA
Roger A. Goldsmith and Andrew F. Bunker Aug. 1979 84 p refs
(Contract N00014-74-C-0262; Grant NSF ATM-77-01475)
(AD-A075009; WHOI-79-70) Avail: NTIS HC A05/MF A01 CSCL 04/2

Scientists at Woods Hole routinely collect and analyze a considerable amount of data relating to the oceans of the world. Of the many different kinds of data, one particular subset concerns those events occurring at the sea surface. A large number of sea surface environmental observations have been collected at Woods Hole. These data, and the subsequent analyses generated from the Air/Sea Heat Flux and the Climatology study projects, have been collected and archived. This document describes the W.H.O.I./Climatology and Air/Sea Interaction (WHOI/CASI) data collection and provides an initial index to its various components. GRA

N80-15780# Oregon State Univ., Corvallis. Dept. of Atmospheric Science.
SOLAR ENERGY METEOROLOGICAL RESEARCH AND TRAINING SITE, REGION 5 Annual Report, 30 Sep. 1977 - 29 Sep. 1978
C. R. N. Rao and E. W. Hewson Jan. 1979 33 p refs
(Grant EY-77-G-06-1059)
(DOE/ET/20172-1) Avail: NTIS HC A03/MF A01

The primary facility for the acquisition of research quality solar radiation and solar energy related meteorological data is described. The training program established with the introduction of two, two-quarter courses on solar radiation and meteorological measurements and on atmospheric radiative processes is discussed. Global irradiance measurements made at the five sites described are presented. DOE

N80-22927# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MARKOV SIMULATIONS OF ONE-AND TWO-DIMENSIONAL WEATHER DATA BASES M.S. Thesis
Steven R. Schroeder Dec. 1979 182 p refs
(AD-A080217; AFIT/GOR/MA/79D-9) Avail: NTIS HC A09/MF A01 CSCL 04/2

In many cases, weather is only one of many inputs to a simulation model, so a realistic but simple weather simulation method should be included in the model. This paper has three major areas of concern: (1) a fairly extensive review of applications of one dimensional Markov and semi-Markov chains to weather data simulations, (2) a consideration of factors involved in and methods that are appropriate for extending Markov concepts to simulating gridded data in two or more dimensions, and (3) evaluation of the proposed methods in terms of realism and simplicity of application. A discussion of the general characteristics of real weather variables and observed weather data in the context of simulating weather as a stochastic process is also given. The data base used for the example consisted of gridded weekly maps of temperature departures from normal in an area of the United States. For most analyses, the data was converted to five states, from state 1 (coldest) to state 5 (warmest). In the real data, it was rare to have an occurrence of unequal and nonconsecutive states in adjacent grid points. Such occurrences were called 'unusual transitions', and one criterion for evaluating the realism of a weather simulation scheme was the frequency of generating such transitions. GRA

N80-27037# Danish Meteorological Inst., Copenhagen.
SEA SURFACE TEMPERATURES IN THE NORTH ATLANTIC 1957 TO 1976
G. Stougaard-Nielsen *In its* On Climate Changes and Related Probl. 1978 p 235-242 refs

Avail: NTIS HC A13/MF A01

Sea surface temperatures for each 1 deg square in the area 50 deg to 80 deg N, 0 deg to 60 deg W were extracted from meteorological log books kept by since 1895. The reports are, stored on magnetic tape at regional centers according to the rules of CMM/WMO. With 20 year of observations stored, a subarea was chosen along the main route between Denmark and Greenland so that the distribution of observations was reasonably close. During most years, no sea ice occurred inside the region. The whole region was divided into 18 areas. Each area covers 4 deg of latitude and 4 deg of longitude, and has a number composed of the latitude and the longitude of the central point. Several tables of mean temperature trends were calculated and a few of them are shown. The mean temperatures for the years 1957 to 1976 and those for the years 1876 to 1915 are compared. Author (ESA)

N80-27040# Air Force Global Weather Central, Offutt AFB, Nebraska.
THE AFGWC AUTOMATED ANALYSIS/FORECAST MODEL SYSTEM
Terry C. Tarbell and James E. Hoke Dec. 1979 80 p refs
(AD-A083157; AFGWC/TN-79/004) Avail: NTIS HC A04/MF A01 CSCL 04/2

This technical note (TN) describes the automated analysis/forecast model system that currently exists at the Air Force Global Weather Central (AFGWC). The emphasis will be on the interrelation and cycling of the various analysis/forecast models in the production cycle. This description of the automated analysis/forecast system was written for managers, programmers, computer operations personnel, users of the ultimate products, and the meteorological community at large. This TN will only address analysis/forecast models that are the primary meteorological data-base builders. Most applications programs that access the data bases are therefore not included. GRA

N80-27086# Interior Dept., Denver, Colo. Water and Power Resources Service.
SIERRA COOPERATION PILOT PROJECT. DATA INVENTORY, 1978 - 1979
Jul. 1979 148 p
(PB80-144934) Avail: NTIS HC A07/MF A01 CSCL 04B

An inventory of all data that were collected from November 1978 to April 1979 in association with the Sierra Cooperative Pilot Project, a weather modification research project in winter orographic cloud seeding is presented. Forecasting, radar, satellite, aircraft, rawinsondes, precipitation gage network, other surface observations, ice nucleus and seeding tracer detection system, ground microphysics, snow profiles, cooperative and operational seeding activities, and National Weather Service are among the topics covered. GRA

N80-34027# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil). National Council of Scientific and Technical Research.
WORKSHOP FOR FORECASTING DROUGHTS IN NORTHEAST BRAZIL ['WORKSHOP' SOBRE PREVISAO DE SECAS PARA O NORDESTE DO BRASIL]
Nelson deJesus Parada, Luiz Gylvan Meira Filho, Antonio Divino Moura, and Vernon Edgar Kousky May 1980 221 p refs In PORTUGUESE and ENGLISH Conf. held in Sao Jose dos Campos, Brazil, 11-15 Feb. 1980
(INPE-1739-RPE/138) Avail: NTIS HC A10/MF A01

Data acouisition and atmospheric modeling of northeast Brazilian weather parameters are discussed. Weather forecasting, drought control, and frost damage to crops are highlighted. Transl. by S.F.

N80-34031# Transportation Systems Center, Cambridge, Mass. Research and Special Programs Administration.
VOICE RESPONSE SYSTEM STATISTICS PROGRAM, OPERATIONAL HANDBOOK Final Research, Apr. 1978 - Dec. 1979
Irwin Englander Jun. 1980 76 p
(AD-A089109; TSC-FAA-80-9; FAA-RD-80-76) Avail NTIS HC A05/MF A01 CSCL 04/2

This report documents the Voice Response System (VRS) Statistics Program developed for the preflight weather briefing VRS. It describes the VRS statistical report format and contents, the software program structure, and the program operation GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

A78-17648 **Norwegian marine geodetic projects.** J. C. Blankenburgh, B. A. Fossum, P. A. Osterholt, and H. O. Torsen (Continental Shelf Institute, Trondheim, Norway). *Marine Geodesy,* vol. 1, no. 2, 1977, p. 125-145. 11 refs.

The hitherto promising finds of oil and gas on the Norwegian continental shelf have increased the general activity in this area considerably. Consequently, the need for better charts and more precise navigational systems have become more pertinent. During the past few years a number of marine geodetic projects have either been planned or embarked upon by various organizations within both the public and private sectors. The article gives a brief review of the Norwegian projects which have special relevance to marine geodesy; this includes the following areas: recommendations, requirements, precision navigation, satellite positioning, reference systems, boundary problems, bathymetry, geological mapping, marine geoid determination, and data base developments. S.C.S.

N77-31760# United States POLYMODE Organizing Committee, Cambridge, Mass.

US POLYMODE PROGRAM AND PLAN

Dec. 1976 95 p refs Sponsored in part by Navy
(PB-267361/4; NSF/IDOE-77-100) Avail: NTIS
HC A05/MF A01 CSCL 08C

POLYMODE is an effort to obtain the minimum data-base which will enable oceanographers to make a major thrust forward in modelling capability. The overall scientific objectives of the U.S. POLYMODE Program is: (1) to carry out field observations and experiments, primarily in open ocean regions of the western North Atlantic designed as far as possible to advance knowledge of the kinematics and dynamics of the variability in that region and to determine their role in the circulation of the North Atlantic subtropical gyre, and (2) to pursue theoretical/numerical modeling of the phenomenon and to apply state-of-the-art theory to the design and rationalization of the POLYMODE field data via both local forecast-process numerical models and high resolution numerical models of the North Atlantic gyre general circulation. GRA

N79-29780# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.

PROCEEDINGS OF MARINE GEOLOGICAL DATA MANAGEMENT WORKSHOP

Herbert Meyers, Michael S. Loughridge, and J. Bruce Grant Dec. 1978 12 p Workshop held at Boulder, Colo., 22 - 24 May 1978
(Grant NSF OCE-77-28270)
(PB-295409/7; NSF/IDOE-79/34) Avail: NTIS
HC A02/MF A01 CSCL 08G

The needs of improving or establishing data bases for engineering properties, rock geochemistry, surficial sediment characteristics etc. were evaluated and endorsed. It was emphatically agreed that data user requirements should be the major driving force in establishing a data management system. A review of the methods used by several major institutions to identify a marine geological sample shows considerable differences from institution to institution and suggests a pressing need to standardize the methodology so that subsequent analyses performed on a sample can be traced or compared. GRA

N79-30010# National Oceanic and Atmospheric Administration, Boulder, Colo. Marine Ecosystems Analysis Program Office.

DATA ADMINISTRATION FOR MARINE ECOSYSTEMS ANALYSIS

Paul A. Eisen, Arleamon Sadler, Jr., and Marilyn E. Scheffler Aug. 1978 88 p refs
(PB-293911/4; NOAA-DM-ERL-MESA-38; NOAA-79030705)
Avail: NTIS HC A05/MF A01 CSCL 08J

The data administration system for storing and retrieving oceanographic data is presented. The system is to make project data and results readily available to users. The project utilizes 3 strategies for organizing data, two utilizing data files, and 1 data base. The project's method for handling data is a flexible file formatting scheme and data catalogue report generation. The total organization of the data system and the strategies (traditional/flexible and data base/key task) are presented. GRA

N80-22960# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Numerical Modeling Div.

THE NORDA/FLENUMOCEANCEN THERMODYNAMICAL OCEAN PREDICTION SYSTEM (TOPS): A TECHNICAL DESCRIPTION

R. Michael Clancy and Paul J. Martin Nov. 1979 34 p refs
(AD-A080248; NORDA-TN-54) Avail: NTIS
HC A03/MF A01 CSCL 08/10

The Thermodynamical Ocean Prediction System (TOPS) is a general and flexible software framework for operational implementation of upper ocean forecast models at Fleet Numerical Oceanography Center (FLENUMOCEANCEN), Monterey, California. It was developed by NORDA Code 322 as a part of the Navy's Automated Environmental Prediction System (AEPS). TOPS is fully interfaced with the FLENUMOCEANCEN operational data base and meets all FLENUMOCEANCEN programming standards for operational programs. This technical note discusses the uses for TOPS, provides documentation of the physics currently represented in the system, indicates probable future developments, and briefly addresses the problem of forecast verification. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N77-22798*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.

THE ANOMALY DATA BASE OF SCREWWORM INFORMATION

L. E. Giddings Oct. 1976 688 p refs
(Contract NAS9-12200)
(NASA-CR-151333; LEC-7922) Avail: NTIS
HC A99/MF A01 CSCL 06C

Standard statistical processing of anomaly data in the screwworm eradication data system is possible from data compiled on magnetic tapes with the Univac 1108 computer. The format and organization of the data in the data base, which is also available on dedicated disc storage, are described. Author

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N76-17080*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SKYLAB MEDICAL DATA CENTER AND ARCHIVES
Fred R. Spross Dec. 1974 13 p
(NASA-TM-X-58148; JSC-09293) Avail: NTIS HC $3.25 CSCL 06E

The founding of the Skylab medical data center and archives as a central area to house medical data from space flights is described. Skylab program strip charts, various daily reports and summaries, experiment reports and logs, status report on Skylab data quality, raw data digital tapes, processed data microfilm, and other Skylab documents are housed in the data center. In addition, this memorandum describes how the data center acted as a central point for the coordination of preflight and postflight baseline data and how it served as coordinator for all data processing through computation and analysis. Also described is a catalog identifying Skylab medical experiments and all related data currently archived in the data center. Author

N77-28727# Michigan Univ., Ann Arbor.
A PSYCHOPHYSICAL ANALYSIS OF COMPLEX INTEGRATED DISPLAYS
Mary Hardzinski and Robert G. Rachella Feb. 1977 59 p refs
(Contract N00014-76-C-0648)
(AD-A039260; Rept-014523-2-T; TR-59) Avail: NTIS HC A04/MF A01 CSCL 05/8

Five types of complex integrated displays were subjected to multidimensional scaling analyses. The display types were selected to be representative of a variety of characteristics that can result when dimensions are combined in an integrated fashion. These characteristics included perceptual separability, familiarity, emergent properties and perceptual interaction among dimensions. Of primary interest was the question of whether or not the Minkowski scaling metric would be diagnostic or predictive of any of these characteristics, as previous literature had indicated. The results showed that in virtually all cases the Euclidean metric produced better fits than the City-Block metric. GRA

N77-30721*# National Aeronautics and Space Administration. Wallops Station, Wallops Island, Va.
REVIEW OF HEALTH MAINTENANCE PROGRAM FINDINGS, 1960-1974
Edward S. White *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic., and Med. Program Advisors 1975 p 119-138
Avail: NTIS HC A13/MF A01 CSCL 06E

A preliminary analysis of the employee's examination records of the automated medical data base at the NASA Wallops Flight Center, Va., with an emphasis on the primary mission of the program-the early detection and control of cardiovascular disease, is presented. I.M.

N79-25740*# General Electric Co., Houston, Tex. Apollo Systems Dept.
USER'S GUIDE FOR THE SKYLAB INTEGRATED MEDICAL DATA ANALYSIS SYSTEM
D. J. Grounds, G. T. Archer, and V. J. Marks 5 Dec. 1975 96 p refs
(Contract NAS9-14523)
(NASA-CR-160189) Avail: NTIS HC A05/MF A01 CSCL 06P

Capabilities of the Skylab Integrated Medical Data Analysis System (SIMDAS) are described and illustrated. User's instructions are also given for the operation of this system on the UNIVAC 1100 Series Demand System at the Johnson Space Center. Author

N80-29029# Oak Ridge National Lab., Tenn. Health and Environmental Studies Program.
CHEMICAL IDENTIFIED IN HUMAN BIOLOGICAL MEDIA: A DATA BASE, VOLUME 1, PART 1, RECORDS 1-1580 Annual Report, Oct. 1979
M. Virginia Cone, comp., Margaret F. Baldauf, comp., Fay M. Martin, comp., and John T. Ensminger, comp. Mar. 1980 314 p refs
(Contract W-7405-eng-26)
(ORNL/EIS-163/V1-P1; APR-1) Avail: NTIS HC A14/MF A01

A comprehensive data base of chemicals identified in human biological media (tissues and body fluids) is presented in two volumes. The data base in given in this volume in tabular form and arranged alphabetically by CAS 'preferred chemical name'. R.E.S.

N80-29030# Oak Ridge National Lab., Tenn. Health and Environmental Studies Program.
CHEMICALS IDENTIFIED IN HUMAN BIOLOGICAL MEDIA: A DATA BASE, VOLUME 1, PART 2, RECORDS 1-1580 Annual Report, Oct. 1979
M. Virginia Cone, comp., Margaret F. Baldauf, comp., Fay M. Martin, comp., and John T. Ensminger, comp. Mar. 1980 816 p refs
(Contract W-7405-eng-26)
(ORNL/EIS-163/V1-P2; APR-1) Avail: NTIS HC A99/MF A01

A comprehensive data base of chemicals identified in human biological media (tissues and body fluids) is presented in two volumes. Introductory material, references, appendices, indices, and a chemical directory are given in this volume as a user guide to the data base. R.E.S.

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

A77-32068 # **Ecopsychiatric aspects of a first human space colony.** J. T. Shurley, K. Natani, and R. Sengel (U.S. Veterans Administration Hospital, Oklahoma City, Okla.). *American Institute of Aeronautics and Astronautics and Princeton University, Conference on Space Manufacturing Facilities, 3rd, Princeton, N.J., May 9-12, 1977, AIAA Paper 77-550.* 9 p. 24 refs. Research supported by the U.S. Veterans Administration Medical Research Program, University of Oklahoma, and NSF.

This paper considers the potential psychosocial problems facing the first technology satellite crew. These include anxiety, depression, hysteria, ineffectual performance, substance abuse, etc. These inferences are drawn from a relevant data base which includes sensory isolation experiments, Antarctic research and others. However, little data is available that bears directly upon the deployment of heterosexual, space colonies. A conceptual approach, based on general systems theory, is presented to organize what data is available and to generate hypotheses to guide the investigative process. From this conceptual approach and from the above data base the authors address possible strategies to deal with anticipated problems. The authors conclude that a full-scale simulation prior to launch and deployment is the best method to test hypotheses and to discover new and emergent behavior patterns. (Author)

N76-13764# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.
THE FEASIBILITY OF GENERALIZED ACOUSTIC SENSOR OPERATOR TRAINING Final Report, Feb. 1974 - Feb. 1975
Richard W. Daniels and David G. Alden May 1975 82 p
(Contract N61339-74-C-0067)
(AD-A011846; NAVTRAEQUIPC-74-C-0067-1) Avail: NTIS CSCL 05/9

This program explored the feasibility of a generalized approach to acoustic sensor operator training and resulted in recommendations concerning implementation. The program involved the analysis of the task, skill, and knowledge requirements for acoustic sensor operators (ASO) across a representative sample of sensor systems. GRA

N76-16758* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
REVIEW OF MEASURED VIBRATION AND NOISE ENVIRONMENTS EXPERIENCED BY PASSENGERS IN AIRCRAFT AND IN GROUND TRANSPORTATION SYSTEMS
David G. Stephens *In its* The 1975 Ride Quality Symp. Nov. 1975 p 65-85 refs
CSCL 05H

Measured vibration and interior noise data are presented for a number of air and surface vehicles. Consideration is given to the importance of direction effects; of vehicle operations such as take-off, cruise, and landing; and of measurement location on the level and frequency of the measurements. Various physical measurement units or descriptors are used to quantify and compare the data. Results suggest the range of vibration and noise associated with a particular mode of transportation and illustrate the comparative levels in terms of each of the descriptors. Collectively, the results form a data base which may be useful in assessing the ride of existing or future systems relative to vehicles in current operation. Author

N77-11667*# Boeing Co., Wichita, Kans.
USER EVALUATION OF RIDE TECHNOLOGY RESEARCH Final Report
J. R. McKenzie and S. H. Brumaghim Washington NASA Nov. 1976 63 p refs
(Contract NAS1-13908)
(NASA-CR-2746; D3-11015-1) Avail: NTIS HC A04/MF A01 CSCL 05H

The 23 organizations queried represent government, carrier, and manufacturing interests in air, marine, rail, and surface transportation systems. Results indicate a strong need for common terminology and data analysis/reporting techniques. The various types of ride criteria currently in use are discussed, particularly in terms of their respective data base requirements. A plan of action is proposed for fulfilling the ride technology needs identified by this study. Author

N78-23747# Federal Aviation Administration, Washington, D. C.
RADAR TRAINING FACILITY PROGRAM IMPLEMENTATION PLAN
A. Asch (Mitre Corp.), G. Beeker (Mitre Corp.), and L. Wuebler Sep. 1977 163 p
(Contract DOT-FA69NS-162)
(AD-A050319/3; FAA-ED-21-5) Avail: NTIS HC A08/MF A01 CSCL 05/9

Information to be utilized for program guidance and management direction during the development and implementation phases of the Federal Aviation Administration's Radar Training Facility (RTF) is presented. The RTF is to be installed at the Aeronautical Center as an element of the FAA Academy for academy level radar training and effective evaluation of developmental terminal and en route Air Traffic Control Specialists. Author

N78-33731*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADAPTATION OF TIME LINE ANALYSIS PROGRAM TO SINGLE PILOT INSTRUMENT FLIGHT RESEARCH
David A. Hinton (Louisville Univ.) and John D. Shaughnessy Aug. 1978 41 p refs
(NASA-TM-78748) Avail: NTIS HC A03/MF A01 CSCL 05H

A data base was developed for SPIFR operation and the program was run. The outputs indicated that further work was necessary on the workload models. In particular, the workload model for the cognitive channel should be modified as the output workload appears to be too small. Included in the needed refinements are models to show the workload when in turbulence, when overshooting a radial or glideslope, and when copying air traffic control clearances. G.G.

N79-16683# National Aviation Facilities Experimental Center, Atlantic City, N. J.
RNAV PROCEDURAL TURN ANTICIPATION TECHNIQUES EXPERIMENT NO. 2, GAT-2A. PHASE 3: 2 AND 4 NMI OFFSET TRACKING PROCEDURES Interim Report, Jul. - Sep. 1977
Bernard Goldberg and Donald Eldredge Sep. 1978 75 p
(FAA Proj. 044-326-340)
(AD-A060501; FAA-NA-78-34; FAA-RD-78-110) Avail: NTIS HC A04/MF A01 CSCL 05/9

The last of a series of interim and data reports dealing with offsets and turn anticipation techniques using a single waypoint analog RNAV (area navigation) system and a noncentered needle CDI (course deviation indicator) instrument is reported. Eight instrument rated pilots participated in a series of flight simulation tests employing pilot techniques which were conducted in order to measure total systems crosstrack (TSCT) and flight technical error (FTE) as well as operational pilot performance. The tests were designed to assess pilot performance for: (1) anticipation of turns while maintaining a desired offset, and (2) steady state parallel offset tracking proficiency. Performance was measured on these variables: horizontal tracking, airspeed control, and procedural performance. G.Y

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

A76-12823 * # **Life sciences manned payloads for Shuttle/Spacelab.** D. B. Heppner, G. L. Drake (General Dynamics Corp., Convair Div., San Diego, Calif.), and C. B. May (NASA, Marshall Space Flight Center, Huntsville, Ala.). *AAS, AIAA, IEEE, ORSA, and IMS, Meeting on Space Shuttle Missions of the 80's, Denver, Colo., Aug. 26-28, 1975, AAS Paper 75-256.* 21 p. Contracts No. NAS8-26468; No. NAS8-29150; No. NAS8-30288; No. NAS8-31368; No. NAS8-29462.

This paper summarizes the highlights of the NASA/MSFC Life Sciences Payload Definition and Integration studies. Four closely related studies describing research requirements, engineering analysis, and design concepts for a family of life sciences laboratories are reviewed. The study approach was based upon a broad laboratory capability to do research in medicine, biology, life support and protective systems, and man-systems integration. This laboratory design concept provides the flexibility desired for the changing requirements of a long-term space program. Designs of the resulting conceptual laboratories that satisfy the research goals are presented. The on-going NASA program activity to support future life sciences involvement in the Spacelab is outlined. (Author)

A76-32241 **SATT revisited - A critical post-examination of the systems approach to training.** R. C. Sugarman, S. L. Johnson, W. M. Hinton, Jr. (Calspan Corp., Buffalo, N.Y.), and C. C. Buckenmaier, Jr. (USAF, Systems Command, Wright-Patterson AFB, Ohio). In: Human factors in our expanding technology; Proceedings of the Nineteenth Annual Meeting, Dallas, Tex., October 14-16, 1975. Santa Monica, Calif., Human Factors Society, 1975, p. 271-273. Contract No. F33657-75-C-0021.

To reduce the redundancy of ambiguous terms that plague the training field, the proceduralized ISD (Instruction System Development) method is shown to be an element of the conceptual framework of the SAT (System Approach to Training) method. The strengths and weaknesses of the SAT process are demonstrated by applying SAT to the design of the B-1 aircrew instructional system. SAT is shown to offer the philosophy of system analysis; at the same time it cannot compensate for technically poor decisions, cannot induce creativity and innovation into the decision processes, and cannot provide more than a pointer to the research that is still required to generate a basis for making good decisions. V.P.

A76-35908 **Computers in clinical electrocardiology - Is vectorcardiography becoming obsolete.** P. M. Rautaharju, H. W. Blackburn, H. K. Wolf, and M. Horacek (Dalhousie University, Halifax, Nova Scotia, Canada; Minnesota, University, Minneapolis, Minn.). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974.
Basel, S. Karger AG, 1976, p. 143-156. 20 refs.

Contrasting functional varieties of ECG analysis programs are discussed along with critical current problems in computer analysis of ECG. In assessing the potential of computer interpretations of ECGs, some trends are emerging although a number of fundamental questions remain unanswered. The characteristics of single versus multiple lead ECG, standard versus vector lead programs, and probabilistic versus deterministic programs are examined. The task of handling multivariate information is highly complex even with computers and with the best available statistical procedures, which gives rise to the problems of data base selection and reduction of redundancy. Most presently available ECG programs are deterministic rather than probabilistic in the sense that they are designed to interpret ECGs according to some set of currently accepted electrocardiographic criteria. Old concepts of strict orthogonality in vectorcardiography should be de-emphasized to create a new basis for computer-aided ECG interpretation involving more heuristic models of cardiac activity. S.D.

A76-40712 **Interactive graphics in the analysis of neuronal spike train data.** R. J. Sclabassi, R. Buchness, and T. Estrin (California, University, Los Angeles, Calif.). *Computers in Biology and Medicine,* vol. 6, July 1976, p. 163-178. 22 refs. Grants No. PHS-NS-02501; No. NIH-FR-3.

The paper outlines an interactive graphics system used in the modeling and analysis of neuronal spike-train data recorded from single nerve cells. In particular, the application of a multiprocessor graphics system to one formulation of the microscopic identification problem in neurophysiology is discussed. The observed experimental spike-train data are characterized as a stochastic point process, and the analytical techniques available to investigate the dependency structure of the data are reviewed. The graphics system developed for this study employs three separate computers, allowing for efficient distribution of tasks between elements in the multiprocessor network. The interactive graphics program is structured as a resident executive with a number of phases available for overlay at execution. The major phases include data base generation, modeling, optimization, data processing, and validation. The implications of the use of interactive graphics in support of studies of this type are discussed. S.D.

A76-40715 **Digital archiving of biomedical recordings for off-line computer analysis.** W. K. Harrison and K. M. Bakalar (Johns Hopkins University, Baltimore, Md.). *Computers in Biology and Medicine,* vol. 6, July 1976, p. 191-198. Grants No. NIH-HL-14928; No. NIH-HL-16907.

This article describes a new procedure for archiving biomedical recordings on industry standard digital magnetic tape. Familiar computer methodology is employed for data-banking heartbeat patterns in a format which has been optimized for later analysis. Recordings are made through an encoder-controller unit coupled to a four channel FM cassette data recorder. This unit produces FM analog magnetic tape with square wave identification and calibration code preceding each sample of biomedical data. Code bits and data sample are timed out sequentially in repetitive standardized format. Digital images of these specially formatted analog tape cassettes are then processed by an edit program on an IBM 370/145. Here, the identifiers are decoded and data sections located. Identification, calibration, and biomedical recordings are then archived on a directory tape which may be efficiently and repeatedly accessed for future computations. (Author)

A76-46036 # **Evaluation of technology for spacecraft water-waste processing systems.** J. M. Spurlock (Georgia Institute of Technology, Atlanta, Ga.), M. Modell (MIT, Cambridge, Mass.), and D. F. Putnam (Umpqua Research Co., Myrtle Creek, Ore.). *International Astronautical Federation, International Astronautical Congress, 27th, Anaheim, Calif., Oct. 10-16, 1976, Paper 76-043.* 7 p. 9 refs.

Methodology has been developed to aid in (1) comparison and evaluation of design concepts for spacecraft waste and water processing systems, and (2) planning and management of technology development for such systems. The procedure provides a common basis for comparison, using available test data and standardized input/output models. It also provides an appropriate tradeoff model and analysis technique for comparing the commonly-based alternative processes. Needed technology developments, to improve performance prospects, can be identified and managed based upon results of this evaluation procedure. Results demonstrated the effectiveness and management benefits of this methodology. (Author)

A78-51222 **Heat transfer principles in personal protection applications.** A. M. Stoll, M. A. Chianta, and J. R. Piergallini (U.S. Naval Material Command Naval Air Development Center, Warminster, Pa.). *SAFE Journal,* vol. 8, Fall, 1978, p. 16-19. 8 refs.

Thermally 'safe' materials, thermal penetration of the cockpit canopy, and rocket plume flames encountered in multiple-seat ejections are discussed with reference to biophysical heat transfer principles and the nature of the physiological effect. Events associated with burn injury and pain sensation are surveyed, and heat transfer by conduction, radiation, and convection are separately examined. The type of pertinent data obtained by experiments currently underway is considered, and aspects requiring more data are indicated. M.L

A79-13187 **Human factors design criteria for transilluminated displays.** R. J. Hall, J. C. Sanderlin (Mission Research Corp., Santa Barbara, Calif.), and R. Cole (Nevada, University, Las Vegas, Nev.). In: Human Factors Society, Annual Meeting, 21st, San Francisco, Calif., October 17-20, 1977, Proceedings. Santa Monica, Calif., Human Factors Society, Inc., 1977, p. 78-82. Contract No. N00123-75-C-0943.

This paper reviews recent studies of human factors design criteria for transilluminated displays and the development of a computerized data base and modeling tools to supplement human engineering design criteria for visual displays. The inherent limitations of present military standards for dealing with a wide range of variables in a variety of operational environments and the need to include changes in the state-of-the-art are addressed. Data base design and computer modeling are suggested as an intermediate approach between out of date standards and costly physical simulation. (Author)

N76-18230*# McDonnell-Douglas Technical Services Co., Inc., Houston, Tex.
ADVANCE CREW PROCEDURES DEVELOPMENT TECHNIQUES: PROCEDURES GENERATION PROGRAM REQUIREMENTS DOCUMENT
J. D. Arbet, R. L. Benbow and M. L. Hawk 20 Dec. 1974 26 p ref
(Contract NAS9-14354)
(NASA-CR-141561; MDC-W1006) Avail: NTIS HC$3.75 CSCL 05H

The Procedures Generation Program (PGP) is described as an automated crew procedures generation and performance monitoring system. Computer software requirements to be implemented in PGP for the Advanced Crew Procedures Development Techniques are outlined. N.E.R.

N76-23166*# General Electric Co., Houston, Tex.
CREW INTERFACE SPECIFICATIONS DEVELOPMENT FOR INFLIGHT MAINTENANCE AND STOWAGE FUNCTIONS Final Report
John G. Carl 12 Nov. 1974 152 p refs
(Contract NAS9-13375)
(NASA-CR-141775) Avail: NTIS HC $6.25 CSCL 05H

Findings and data products developed during crew specification study for inflight maintenance and stowage functions are reported. From this information base, a family of data concepts to support crew inflight troubleshooting and corrective maintenance activities was developed and specified. Recommendations are made for the improvement of inflight maintenance planning, preparations and operations in future space flight programs through the establishment of an inflight maintenance organization and specific suggestions for techniques to improve the management of the inflight maintenance function. Author

N76-21909# Air Force Human Resources Lab., Brooks AFB, Tex.
ENVIRONMENTAL DATA BASE DEVELOPMENT PROCESS FOR THE ASUPT CIG SYSTEM Final Report
Eric G. Monroe Aug. 1975 67 p
(AF Proj. 1192)
(AD-A017845; AFHRL-TR-75-24) Avail: NTIS CSCL 05/9

This report was prepared under the assumption that the reader has a general understanding of the Advanced Simulator for Undergraduate Pilot Training (ASUPT) Computer Image Generation (CIG) System, at least to the level of that presented in the technical report, Advanced Simulation in Undergraduate Pilot Training (ASUPT) Facility Utilization Plan. Modeling for CIG may be thought of as a new art form in which the features to be modeled are approximated by sets of straight line segments forming planar faces to which a shade of gray is assigned. Basically the data base is structured in the sequence edge, face, object, model, and environment, each item composed of a set of the items immediately preceeding it in the sequence. The detailed definition of each item is transferred from the coding forms prepared by the modeler to computer input cards. These cards serve as the computer source input. The offline software algorithms perform validation checks on this input. Error messages are related through the teletype and line printer. Valid data is stored as libraries of objects, models and environments on magnetic tapes, and the appropriate environment is restored on disc by a media conversion from tape to disc. GRA

N76-33845*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NASA AVIATION SAFETY REPORTING SYSTEM Quarterly Report, 15 Apr. - 14 Jul. 1976
Charles E. Billings, John K. Lauber, Hallie Funkhouser, E. Gene Lyman, and Edward M. Huff Washington Sep. 1976 23 p
(NASA-TM-X-3445; A-6743; QR-76-1) Avail: NTIS HC $3.50 CSCL 05B

The origins and development of the NASA Aviation Safety Reporting System (ASRS) are briefly reviewed. The results of the first quarter's activity are summarized and discussed. Examples are given of bulletins describing potential air safety hazards, and the disposition of these bulletins. During the first quarter of operation, the ASRS received 1464 reports, 1407 provided data relevant to air safety. All reports are being processed for entry into the ASRS data base. During the reporting period, 130 alert bulletins describing possible problems in the aviation system were generated and disseminated. Responses were received from FAA and others regarding 108 of the alert bulletins. Action was being taken with respect to 70 of the 108 responses received. Further studies are planned of a number of areas, including human factors problems related to automation of the ground and airborne portions of the national aviation system. Author

N77-18742# Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
A PROGRESS REPORT ON VISIONS: REPRESENTATION AND CONTROL IN THE CONSTRUCTION OF VISUAL MODELS Interim Report
Allen R. Hanson and Edward M. Riseman Jul. 1976 59 p refs
(Contract N00014-75-C-0459; Grant NSF DCR-75-16098)
(AD-A028329; COINS-TR-76-9) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report is an interim progress report on the evolving structure of VISIONS, a computer system for general visual perception. The goal of the system is the segmentation and interpretation of a digitized color image of natural outdoor scenes. The report outlines the multi-level data structures used for representing both a visual model of the scene and the semantic data base of stored knowledge about the world. A flexible modular strategy controls the operation of processes which embody diverse forms of knowledge, and allows both data-directed and knowledge-directed model building. A model search space is used to store a sketch of the processing history during model formation, so that limited, directed back-tracking will be facilitated. GRA

N77-18757# Construction Engineering Research Lab. (Army), Champaign, Ill.
CONCEPTUALIZATION OF HABITABILITY EXPRESSIONS FOR THE HABITABILITY DATA BASE Interim Report
T. A. Davis Aug. 1976 62 p refs
(DA Proj. 4A7-62719-AT-03)
(AD-A029661; CERL-TR-D-68) Avail: NTIS HC A04/MF A01 CSCL 13/13

Habitability is defined and documents containing statements on habitability are identified within the context of the Corps of Engineers facility delivery process. This process is described as a cycle of events that includes master planning, construction programming, project development, design, and construction. Three generic and ten specific habitability expressions are conceptualized which relate properties of occupant activities (physical, physiological, and mental) to properties of facilities (dimensions of length, width, light and sound levels, temperature, etc.). Three expressions of cost-effectiveness are conceptualized as ratios of the dollar cost of a facility, facility property, or property categories divided by units of occupant needs for health, safety, performance and satisfactions. Structural, content, and technical assumptions are given, and data categories are defined by example. Further steps toward the development of prototype expressions are outlined. Author (GRA)

N77-27712# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
WORKING PAPERS IN ACQUISITION OF KNOWLEDGE FOR IMAGE UNDERSTANDING Interim Report
Omer Akin, Raj Reddy, Ronald Ohlander, and Marty Schultz 15 Dec. 1977 60 p refs
(Contract F44620-73-C-0074; AF Proj. 2304)
(AD-A037789; AFOSR-77-0325TR) Avail: NTIS HC A04/MF A01 CSCL 09/2

Use of knowledge has facilitated complex problem solving in many areas of research. However, in the Image Understanding area, we do not have any systematic treatment and codification of knowledge that is useful in image perception. Further, we do not even have adequate tools for acquiring the necessary knowledge base. In this report we present an experimental paradigm for knowledge acquisition, discuss an analysis technique, and illustrate the different types of knowledge that seem to be useful in image understanding research. In the first paper, three major aspects of knowledge are presented: primitive feature extraction operators, rewriting rules, and flow of control. The second paper discusses the picture-puzzle paradigm and the various ways in which it can be used as a tool for acquisition of knowledge. The third paper deals with a computer program that assists the transcription of typical protocols obtained from the picture puzzle tasks. Finally, the last paper of the report discusses the pros and cons of using eye-fixation data to acquire knowledge used in some of the tasks of the picture-puzzle paradigm. The total effort represents an account of the initial results of a new experimental paradigm. We hope that this will provide a sound basis for understanding the issues of knowledge used in visual perception and aid in the modelling of seeing systems GRA

N77-27713# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
CRITICAL REVIEW AND ANALYSIS OF PERFORMANCE MODELS APPLICABLE TO MANMACHINE SYSTEMS EVALUATION Interim Scientific Report, 1 Oct. 1975 - 30 Sep. 1976
Richard W. Pew, Carl E. Feehrer, Sheldon Baron, and Duncan C. Miller Mar. 1977 306 p refs
(Contract F44620-76-C-0029)
(AD-A038597; BBN-3446; AFOSR-77-0520TR) Avail: NTIS HC A14/MF A01 CSCL 05/8

This report focuses on the review of potentially relevant models and on the identification of issues in model development and application that may have an important impact on models for large-scale, man-machine systems. A detailed and critical evaluation of several classes of human-performance models is presented. Interrelations among existing models are examined, and an evaluation is made on the needs and gaps in the technology. Modelling issues are identified, and research recommendations indicated. Approximately forty models, techniques that have some applicability to the simulation modelling program are abstracted in the Appendix. Author (GRA)

N77-29794# Canyon Research Group, Inc., Westlake Village, Calif.
ANALYSIS OF HUMAN FACTORS ENGINEERING EXPERIMENTS: CHARACTERISTICS, RESULTS, AND APPLICATIONS Interim Report
Charles W. Simon Aug. 1976 119 p refs Prepared in cooperation with Hughes Aircraft Co., Culver City, Calif.
(Contracts F44620-76-C-0008; F44620-72-C-0086)
(AD-A038184; CWS-02-76; AFOSR-77-0333TR) Avail: NTIS HC A06/MF A01 CSCL 05/5

Two hundred thirty-nine experiments published in the Journal, Human Factors, during the period from 1958 to 1972 were analyzed for the purpose of discovering the characteristics of their experimental plans, the quality and character of their results, and the degree to which these results had been applied to real systems. The analysis revealed that these experiments investigated too small an experimental space, showed essentially no diversity in their selection of a basic experimental design, collected far more redundant data than was needed, and failed to properly handle the irrelevant variance arising from sequence effects. When a survey was made of those who conducted the experiments, it was discovered that slightly more than half of the experiments had been done to find answers of general applicability; less than a third were known or believed to have influenced the design of a real system. A majority of the investigators said they would not do their experiments any differently if they were to repeat them today. Some limited discussion on the implications of this analysis for an improved experimental methodology is included. GRA

N77-32729# Army Construction Engineering Research Lab., Champaign, Ill.
DEVELOPMENT OF AN OBJECTIVE DEFINITION OF HABITABILITY AND A HABITABILITY DATA BASE Final Report
Roger L. Brauer and Thomas A. Davis Jun. 1977 37 p refs
(AD-A041188; CERL-SR-D-79) Avail: NTIS HC A03/MF A01 CSCL 05/5

This report summarizes the work performed in two areas: development of an objective definition of habitability and development of a habitability data base. Although it has been assumed that an absolute, objective definition of habitability cannot be reached because of the subject's dynamic nature, considerable progress has been made in developing a definition which provides a means for dealing systematically with habitability data. The prototype Habitability Data Base which has been developed provides a way of collecting, analyzing, storing, and retrieving such data. Recommendations for continuing development in both areas are also presented. Author (GRA)

N79-17880# School of Aerospace Medicine, Brooks AFB, Tex.
THE DYNAMIC OXYGEN-REGULATOR TEST STAND Final Report, Jun. 1976 - Dec. 1977
Ronald D. Holden, F. Wesley Baumgardner, and Bruce F. Hiott Jun. 1978 13 p refs
(AF Proj. 7930)
(AD-A060978; SAM-TR-78-25) Avail: NTIS HC A02/MF A01 CSCL 14/2

The basic design of oxygen-breathing regulators has undergone minimal change during the last two decades. Performance standards for oxygen regulators have been based on continuous flows of gas at constant levels of flow, which do not represent the operational requirements of this equipment. To broaden the data base of oxygen-regulator performance characteristics, a test stand has been developed that imposes a wide range of constant and cyclically varying flows on the breathing-gas delivery system. Its use permits evaluation of oxygen-delivery equipment under more realistic conditions, which more closely match human breathing patterns. Using performance characteristics of oxygen regulators in the current USAF inventory, test procedures are being established; and design criteria will be developed for a new generation of breathing-gas delivery systems. By meeting these criteria, oxygen-delivery systems will be more appropriately responsive to the actual physiological requirements of crewmembers in high-performance aircraft. Author (GRA)

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

A76-44153 **National Computer Conference, Anaheim, Calif., May 19-22, 1975.** Conference sponsored by the Data Processing Management Association, IEEE, Association for Computing Machinery, Society for Computer Simulation, and AFIPS. Montvale, N.J., AFIPS Press (AFIPS Conference Proceedings. Volume 44), 1975. 1011 p. $50.

The papers collected in this volume are divided into two types: those dealing with recent advances in computer operations analysis, hardware, and software, and those examining computing from the user's viewpoint and describing applications in various fields. Some of the topics covered include tools and techniques of microprocessor data transfer, a portable compiler for industrial microcomputer systems, macrologic for high performance digital systems, dynamic control schemes for a packet switched multi-access broadcast channel, extensibility in programming language design, a synthesizer of inductive assertions, hardware implementation of algebraic codes, bubble domain memory systems, medical information systems, computer-aided manufacturing, and computer system simulation and performance evaluation. P.T.H.

A77-49721 **National Computer Conference, Dallas, Tex., June 13-16, 1977, Proceedings.** Conference sponsored by the American Federation of Information Processing Societies. Edited by R. R. Korfhage (Southern Methodist University, Dallas, Tex.). Montvale, N.J., AFIPS Press (AFIPS Conference Proceedings. Volume 46), 1977. 1039 p. Members, $30.; nonmembers, $60.

Computer data base administration, the selection of computer architectures, communication networks using packet-switching, and applications of computing techniques to such topics as clinical research, graphics, information services and transportation networks are discussed. Subjects of the papers include fault tree analysis of computer systems, a technique for automatic acquisition of three-dimensional data, the evaluation of computer architectures through test programs, microprocessor architectures, the impact of microprocessors on health care, computer hardware design, a comprehensive computer base of information on petroleum resources, modular multimicroprocessors, software acquisition, the design and implementation of an information base for use in decision-making, and a multimicroprocessor approach to high-speed low-cost continuous-system simulations. J.M.B.

A78-26176 * **Data Management Symposium, Huntsville, Ala., October 18, 19, 1977, Proceedings.** Symposium sponsored by NASA and University of Alabama. Edited by A. Castell (Alabama, University, Huntsville, Ala.). Huntsville, Ala., University of Alabama, 1978. 357 p.

The transfer, processing, and use of satellite data are discussed. Topics relating to simulation and processing techniques include computer design assessments through simulation, data system dynamic simulation, and future timing accuracy requirements and procedures for data processing. Subjects relevant to data base management systems and users and their needs include an image-based information system architecture for correlation satellite and topological data base, efficient searching and sorting applications using an associative array processor, analysis of user's needs for a large technical data base, and variable length data formats. The technology development outlook was considered with attention to data systems technology outlook for supporting NASA programs, a user-oriented interactive information extraction system, and flow control and sorting techniques for telemetry packets. M.L.

A78-26190 # **Analysis of users' needs for a large technical data base.** D. L. Christensen (Alabama, University, Huntsville, Ala.). In: Data Management Symposium, Huntsville, Ala., October 18, 19, 1977, Proceedings. Huntsville, Ala., University of Alabama, 1978, p. 209-218.

The purpose of this presentation is to provide a general review of data management systems and their relationships to data users and their needs, to survey some of the users' techniques in systems analysis, and then to relate these ideas to an existing large-scale data base. The presentation will also relate this to an expanded large-scale data base that has also been developed and will then arrive at a summary and conclusions concerning directions for the future. The paper describes the needs of data managers and users in general and then goes into the details of a rationale for developing information systems and data networks based on a systematic procedure for evaluating, and then meeting, the actual needs of the user community. (Author)

A79-27291 **Winter Simulation Conference, Miami Beach, Fla., December 4-6, 1978, Proceedings. Volumes 1 & 2.** Conference sponsored by IEEE, NBS, AIIE, SCS, ACM, TIMS, and ORSA. Edited by H. J. Highland (New York, State University, Farmingdale, N.Y.), N. R. Nielsen (SRI International, Menlo Park, Calif.), and L. G. Hull (NASA, Goddard Space Flight Center, Greenbelt, Md.). Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1978. Vol. 1, 415 p.; vol. 2, 675 p. Price of two volumes, $48.

The papers report on the various aspects of simulation such as random variate generation, simulation optimization, ranking and selection of alternatives, model management, documentation, data bases, and instructional methods. Simulation studies in a wide variety of fields are described, including system design and scheduling, government and social systems, agriculture, computer systems, the military, transportation, corporate planning, ecosystems, health care, manufacturing and industrial systems, computer networks, education, energy, production planning and control, financial models, behavioral models, information systems, and inventory control. P.T.H.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering*.

A75-41501 **Space and time savings through large data base compression and dynamic restructuring.** P. A. Alsberg (Illinois, University, Urbana, Ill.). *IEEE, Proceedings*, vol. 63, Aug. 1975, p. 1114-1122. 8 refs.

Approaches are discussed for reducing the size of the data base. Such a reduction has various advantages related to savings in processing time, the decrease in storage costs, and a reduced response time. A description of data compression methods is given, taking into account data compression schemes, the compressing and scanning of the data base, and some specific examples. The automatic restructuring of the data base is considered in order to reduce the transfer of superfluous data. G.R.

A76-17479 # **Formal description of files in the AIDOS data bank system (Formale Beschreibung der Dateien des Datenbanksystems AIDOS).** R. Petzold (Dresden, Technische Universität, Dresden, East Germany). ***Wissenschaftliche Zeitschrift***, vol. 24, no. 3-4, 1975, p. 579-586. 12 refs. In German.

An approach developed by Müller (1972) for the classification of data structures is utilized in the description procedure employed for the files. The formal description method considered is to reduce the required information volume and to facilitate a speedy retrieval of needed data. Details concerning the code symbols used in the case of the individual files of the data bank are presented. G.R.

A76-28082 **SYNOP - A versatile tool in comparing differences of ERTS, RB-57 and ground-based data banks.** W. W. Kuhlow (Wisconsin, University, Madison, Wis.). In: Remote sensing of earth resources. Volume 4 - Proceedings of the Fourth Annual Conference on Earth Resources, Tullahoma, Tenn., March 24-26, 1975.
Tullahoma, University of Tennessee, 1975, p. 691-711.

With increasing frequency spatial data banks are being constructed from information derived from remote sensed imagery collected by satellite and airborne sensors to complement existing data banks built from on-the-ground observations. When comparing the data banks derived from these three sources for the same geographical area, two areas of concern naturally arise: differences in spatial resolution and differences in time of data collection. This paper addresses these two problems in the context of results derived from a computer program, SYNOP, developed to easily compare the differences and similarities in the selection of a corridor route for the same area when the data banks were derived from ERTS-1, RB-57 (high altitude aircraft), and conventional data, and to present the data in such a format that changes in land cover due to the passage of time are easy to detect and interpret. (Author)

A76-46073 # **An automated system for processing of scientific information obtained by space experiments.** M. D. Karadimov and I. S. Kutiev (B'lgarska Akademiia na Naukite, Laboratoriia za Kosmicheski Issledovaniia, Sofia, Bulgaria). *International Astronautical Federation, International Astronautical Congress, 27th, Anaheim, Calif., Oct. 10-16, 1976, Paper 76-178.* 4 p.

The paper examines an approach to the realization of a data base for an automated system for the processing and storing of the information collected by a variable number of scientific instruments of a satellite. The general idea of the data base is as follows: The scientific data is supplied on magnetic tapes. The system parameters (the number of instruments, their numeration, and the numeration of telemetric channels for each instrument) are supplied on punched cards. The program package for data base development and maintenance forms a working file of the data on a magnetic disk. B.J.

A77-25691 **Trends in computers and computing - The information utility.** S. E. Madnick (MIT, Cambridge, Mass.). *Science,* vol. 195, Mar. 18, 1977, p. 1191-1199. 42 refs.

The structure of classical computer-based information systems is examined and new developments are considered, taking into account the concept of the information utility which has emerged in response to demands for more effective information management, coupled with advances in computer hardware and software technology. According to the new concept, computers specialized for information storage and processing serve as information nodes. Approaches for the development of specialized information nodes are discussed, giving attention to firmware enhancement, intelligent controllers, minicomputer back-end processors, and highly modular database machines. G.R.

A77-28925 **Data structures and computer architecture: Design issues at the hardware/software interface.** K. J. Thurber (Sperry Rand Corp., Sperry Univac Div., Blue Bell, Pa; Minnesota, University, Minneapolis, Minn.) and P. C. Patton (Minnesota, University, Minneapolis, Minn.). Lexington, Mass., D.C. Heath and Co., 1977. 215 p. 289 refs. $16.95.

Attention is focused on the interface between computer architecture, memory management systems, data structures, and data management systems. The book is aimed at discussing tradeoffs and trends in each of these areas as they relate to software systems and the hardware on which the data system applications may run. Types of tradeoff options available and impact on the choices on overall system performance are described for the guidance of both hardware and software designers. Major subject headings are: data structures and algorithms, data organization and memory management, data base organization and access methods, data description languages, and computer architecture and data structures. R.D.V.

A77-43815 * **Data management in pattern recognition and image processing systems.** A. L. Zobrist and N. A. Bryant (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). In: Western Electronic Show and Convention, Los Angeles, Calif., September 14-17, 1976, Technical Papers.
North Hollywood, Calif., Western Periodicals Co., 1976, p. 13/3-1 to 13/3-4. 5 refs.

Data management considerations are important to any system which handles large volumes of data or where the manipulation of data is technically sophisticated. A particular problem is the introduction of image-formatted files into the mainstream of data processing application. This report describes a comprehensive system for the manipulation of image, tabular, and graphical data sets which involve conversions between the various data types. A key characteristic is the use of image processing technology to accomplish data management tasks. Because of this, the term 'image-based information system' has been adopted. (Author)

A78-26187 * # **Round-Robin approach to data flow optimization.** J. Witt. In: Data Management Symposium, Huntsville, Ala., October 18, 19, 1977, Proceedings. Huntsville, Ala., University of Alabama, 1978, p. 169-177. Contract No. NAS7-100.

A large data base, circular in structure, was required (for the Voyager Mission to Jupiter/Saturn) with the capability to completely update the data every four hours during high activity periods. The data is stored in key ordered format for retrieval but is not input in key order. Existing access methods for large data bases with rapid data replacement by keys become inefficient as the volume of data being replaced grows. The Round-Robin method was developed to alleviate this problem. The Round-Robin access method allows rapid updating of the data with continuous self cleaning where the oldest data (by key) is deleted and the newest data (by key) is kept regardless of the order of input. (Author)

A79-12032 **Digital processing of 3-D data to generate interactive real-time dynamic pictures.** S. R. Black (Evans and Sutherland Computer Corp., Salt Lake City, Utah). In: Three-dimensional imaging; Proceedings of the Seminar, San Diego, Calif., August 25, 26, 1977. Bellingham, Wash., Society of Photo-Optical Instrumentation Engineers, 1977, p. 52-61.

The paper discusses the creation of digital models, noting how the model data base is processed by a digital image processor in order to create an interactive real-time display. Consideration is given to the derivation of the data base from various sources, the processing of the data base into an expanded machine language format by a software compiler, and a recent wire frame model. The image generator is described with reference to the simulator and host computer, the data base manager, the coordinate transformation processor, view-port clipper, and raster scan converter. The final conversion of the digital information into analog signals used to drive the video amplifier of the display monitor is described. S.C.S.

A79-40352 **DBC - A database computer for very large databases.** J. Banerjee, D. K. Hsiao (Ohio State University, Columbus, Ohio), and K. Kannan (IBM Thomas J. Watson Research Center, Yorktown Heights, N.Y.). *IEEE Transactions on Computers*, vol. C-28, June 1979, p. 414-429. 22 refs. Contract No. N00014-75-C-0573.

The design of a database computer (DBC) that incorporates as much specialized hardware as possible, with high performance and low cost is discussed. Five goals were set for achievement: (1) the ability to handle an on-line database of at least 10 Gbytes; (2) to build the DBC with existing technology; (3) to compete with existing software-laden DBMS; (4) to design a failsafe security system; and (5) to ensure that the back-ended DBC be able to interface with front-end computers while supporting present DBM applications such as the CODASYL or hierarchical data models. The overall architecture was described, emphasizing on-line mass memory. Specific detail was given to tracks-in-parallel read-out capability and logic-per-track, to maximize content addressability. A structure memory was designed to make auxiliary information more accessible, especially in dealing with search precision and access control. The large on-line database store required a modified moving-head disk while other technologies such as bubble memories or CCD's were used for the structure memory. Other components, such as keyword transformation unit and the security filter processor and their relationships with the structure memory and on-line database store were described and flow-charted. Interfacing the back-end DBC with front-end general purpose computers also provided an effective cluster mechanism. C.F.W.

A79-40353 **The architectural features and implementation techniques of the multicell CASSM.** S. Y. W. Su, L. H. Nguyen, A. Emam (Florida, University, Gainesville, Fla.), and G. J. Lipovski (Texas, University, Austin, Tex.). *IEEE Transactions on Computers*, vol. C-28, June 1979, p. 430-445. 49 refs. NSF Grants No. GJ-43225; No. MCS-76-21029; Contract No. F49620-77-C-0101.

The architectural characteristics and the implementation techniques of a context addressed segment sequential memory system called CASSM are described. The system provides hardware support for many database management functions. It offers associative and parallel processing capabilities for the efficient retrieval and manipulation of data in large databases. The hardware is designed mainly to support a hierarchical model for database applications but also contains facilities for supporting a wide range of data searches and operations useful for other nonnumeric data processing applications. The software development of the assembly language CASAL and its assembler, the high-level nonprocedural language CASDAL and its compiler, the interface to the CASSM-user interface computer, etc., have been carried out for the system. The hardware design and implementation techniques have been verified using a one-cell prototype system and a simulator designed for testing the system in the multicell environment. The emphasis of this paper is in the detailed description of the hardware features and techniques used in the multicell CASSM system. (Author)

A79-41114 **Architecture of a logic simulation system.** J. W. Walker (Hughes Aircraft Co., Culver City, Calif.). In: Annual Asilomar Conference on Circuits, Systems, and Computers, 12th, Pacific Grove, Calif., November 6-8, 1978, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 144-148.

Logic simulation is performed several times during the life cycle of a digital assembly. A data base and configuration management system serve to coordinate the various computer-aided design activities. A five state simulator and a three state transitional X fault simulator are utilized in Hughes Aircraft's Digital Simulation and Test System (DIGISAT). A worst case race/hazard analysis is reported. A brief description of the system inputs and outputs is presented. (Author)

A79-47811 # **Engineering and manufacturing communication via the computer data base.** E. N. Nilson (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, Conn.). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Meeting, New York, N.Y., Aug. 20-22, 1979, Paper 79-1845.* 8 p. 12 refs.

The most substantial reductions in lead time and cost to be realized across the design/manufacturing interface come from integrated interactive CAD/CAM. The computer data base performs the fundamental communication function. The present status of this technology, the extent of its utilization, its implementation, examples of applications, potential benefits to be derived, implementation problems and solutions, and the developing CAD/CAM technology are the subject of this paper. (Author)

A79-54395 # **Toward a small, real-time relational data base machine.** D. W. Dearholt (New Mexico State University, Las Cruces, N. Mex.) and R. H. Evans (U.S. Navy, Naval Research Laboratory, Washington, D.C.). In: Computers in Aerospace Conference, 2nd, Los Angeles, Calif., October 22-24, 1979, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1979, p. 105-110. 6 refs. (AIAA 79-1929)

The paper presents some of the design objectives for a relational data base management (RDBM) and discusses the steps necessary in meeting these objectives. The design is divided into two phases: (1) the data definition, data manipulation, and query functions, and (2) facilities for answering queries requiring access to more than one relation as well as sharing data with other nodes in a network of machines, while retaining the capabilities achieved in phase one. The logical characteristics of a RDBM system are discussed, emphasizing whether they are implemented primarily in hardware or in software. Attention is given to the suggested design phases, to a candidate architecture for a RDBM system, and to a discussion of various problems associated with the design of the second phase. A method of storing and accessing tables of data is presented along with procedures for implementing the data operations needed for the first design phase. Finally, a brief comparison is made between the RDBM system and various alternative approaches. C.F.W.

A80-19057 **Intelligent magnetic bubble memories and their applications in data base management systems.** J. W. S. Liu (Illinois, University, Urbana, Ill.) and M. Jino (Campinas, Universidade Estadual, Campinas, São Paulo, Brazil). *IEEE Transactions on Computers*, vol. C-28, Dec. 1979, p. 888-906. 30 refs. NSF Grant No. MCS-77-27910.

The design of intelligent magnetic bubble memories which may be used to support high-level data base management functions is discussed. They may also be used to provide users with large work spaces in which elementary file processing operations may be performed without external intervention. Ways of incorporating in the design of these memories the novel chip organizations and unique features of magnetic bubble memories are explored. In particular, the performance of various memory organizations and storage organizations for different magnetic bubble chips is evaluated. Retrieval times per word and per page are the parameters used to evaluate the different memory organizations, and performance of hierarchical bubble memory systems are discussed. The data rearrangement operations capable of being carried out in bubble memories are incorporated in the design of elementary file processing operations and basic relational algebraic operations. An architecture of intelligent magnetic bubble memory designed to support the relational data model and to enhance a relational algebraic interface is described. (Author)

A80-32485 **Fault isolation testing through automatic data base generation.** T. A. LaRotonda (Westinghouse Electronic Systems Center, Baltimore, Md.). In: Challenge of the '80s; Proceedings of the Third Digital Avionics Systems Conference, Fort Worth, Tex., November 6-8, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 330-334.

The paper discusses a built in testing/fault isolation testing (BIT/FIT) technique used in avionics systems. The major problem of writing BIT/FIT software for an embedded computer system is getting from the written I/O document to the physical stimulus of a unit under test (UUT), and from the physical output of the UUT to a readable output. A support software package which is driven by these I/O documents (FIT Translator/Loader) is described. V.T.

A80-50808 * **On deadlock detection in distributed systems.** V. D. Gligor and S. H. Shattuck (Maryland, University, College Park, Md.). *IEEE Transactions on Software Engineering*, vol. SE-6, Sept. 1980, p. 435-440. 7 refs. Contract No. NAS5-24407.

A hierarchically organized and a distributed protocol for deadlock detection in distributed databases are presented in a previous study Menasce and Muntz (1979). In this paper, it is shown that the distributed protocol is incorrect, and possible remedies are presented. However, the distributed protocol remains impractical because 'condensations' of 'transaction-wait-for' graphs make graph updates difficult to perform. Delayed graph updates cause the occurrence of false deadlocks in this as well as in some other deadlock detection protocols for distributed systems. The performance degradation that results from false deadlocks depends on the characteristics of each protocol. (Author)

N75-18812# Naval Academy, Annapolis, Md. Environmental Protection Research and Development Team.

A LOW COST MINICOMPUTER DATA BASE Report for 1 Jul. - 31 Aug. 1973

Frederick A. Skove 28 May 1974 30 p refs

(AD-A000948; USNA-EPRD-5) Avail: NTIS CSCL 09/2

The report is written in an attempt to assess the electronic computer capability needed for a Navy-wide Environmental Protection Data Base (NEPDB) which will store data pertaining to ships, aircraft, and shore activities. The Base may vary from 0 to 100% centralization and from 0 to 100% automation of numerical and textual data handling. It is the intention of this report to show that with the use of minicomputers, large data processing equipment may not be necessary. The seemingly obvious concept of one large data bank, with one large computer centrally located may not be the way to maximize output while keeping costs at a minimum GRA

N75-21038*# Universities Space Research Association, Charlottesville, Va. Inst. for Computer Applications in Science and Engineering.

SET PROCESSING IN A NETWORK ENVIRONMENT

W. T. Hardgrave 31 Mar. 1975 54 p refs

(Grants NGR-47-102-001; NsG-1088)

(NASA-CR-142597; ICASE-75-7) Avail: NTIS HC $4.25 CSCL 09B

A combination of a local network, a mass storage system, and an autonomous set processor serving as a data/storage management machine is described. Its characteristics include: content-accessible data bases usable from all connected devices; efficient storage/access of large data bases; simple and direct programming with data manipulation and storage management handled by the set processor; simple data base design and entry from source representation to set processor representation with no predefinition necessary; capability available for user sort/order specification; significant reduction in tape/disk pack storage and mounts; flexible environment that allows upgrading hardware/software configuration without causing major interruptions in service; minimal traffic on data communications network; and improved central memory usage on large processors. Author

N75-25916# Naval Underwater Systems Center, Newport, R.I.

FUNCTIONAL DESCRIPTION OF AN AUTOMATED CONFIGURATION MANAGEMENT INFORMATION SYSTEM

David A. Cobb 11 Feb. 1975 44 p

(AD-A008336; NUSC-TD-4802) Avail: NTIS CSCL 09/2

The capabilities of the existing computerized configuration management information system are specified. The system is viewed as it appears to the user: a set of report products in response to the informational needs of the users. GRA

N75-32781# Computer Sciences Corp., Silver Spring, Md. System Sciences Div.

FEASIBILITY STUDY OF A QUADRILATERALIZED SPHERICAL CUBE EARTH DATA BASE Final Report, May 1974 - Mar. 1975

F. K. Chan and E. M. O'Neill 14 Apr. 1975 137 p refs

(Contract N00314-74-C-1340)

(AD-A010232; CSC/TR-75/6007; EPRF-TR-2-75(CSC)) Avail: NTIS CSCL 09/2

This report describes the results of research into the feasibility of storing satellite meteorological data in a high-resolution, equal-area, computer-accessible data base. Equal area elements are stored in square arrays representing the faces of a cube inscribed within the earth. The required area-preserving transformation is presented along with its inverse. A unique array-mapping scheme is presented, which preserves near-neighbor relations and allows rapid index computation. The implementation of this data base on rotational storage devices is discussed, and calculated execution times are presented. GRA

N75-33744# RAND Corp., Santa Monica, Calif.

COMPUTER PRIVACY AND COMPUTER SECURITY

Willis H. Ware Oct. 1974 8 p Repr. from Bull. of the Am. Soc. for Inform. Sci., v. 1, no. 3, Oct. 1974

(AD-A010865; P-5354) Avail: NTIS CSCL 09/2

The following topics are discussed: The privacy trade-off; Technical vs. legal problems; Legislating the issue; A limit to laws. GRA

N76-11740# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.

AN ANALYSIS OF OPTIMAL RETRIEVAL SYSTEMS WITH UPDATES

Richard A. Flower Jun. 1975 74 p refs

(Contract DAAB07-74-C-0630; Grant NSF GK-37582)

(AD-A012308; TR-488) Avail: NTIS CSCL 09/2

The performance of computer-implemented systems for data storage, retrieval, and update was investigated. A memory that is bit-addressable by an algorithm or an automaton models a computer. A retrieval system is composed of a particular mapping of data bases onto memory representations and a particular algorithm or automaton. By accessing bits of memory, the algorithm can answer any questions about the d represented in memory and can update memory. Lower bounds are derived for the performance measures of storage efficiency, retrieval efficiency, and update efficiency. The minima are simultaneously attainable by a retrieval system for some data structures of interest. Trading relations between the measures exist for other data structures. Author

N76-12787# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

ANALYSIS OF NATURAL SCENES Interim Report

Ronald B. Ohlander Apr. 1975 209 p refs

(Contract F44620-73-C-0074; ARPA Order 2466)

(AD-A012857; AFOSR-75-1090TR) Avail: NTIS CSCL 09/2

This report describes work performed on two aspects of the scene analysis process. These are segmentation, and the treatment of occlusions, shadows, and highlights. The eventual goal of the research is the formulation of knowledge sources which play an important role in a model for a general vision system. The model is based on the hypothesize-and-test paradigm and consists of a number of independent knowledge sources which cooperate through a global data base. GRA

N76-12788# Kansas State Univ., Manhattan. Dept. of Computer Science.

USABILITY AND FEASIBILITY OF BACK-END MINICOMPUTERS Technical Report, Feb. - Jun. 1975
F. Maryanski, Paul Fisher, and V. Wallentine Jun. 1975 154 p refs
(Grant DAHC04-75-G-0137)
(AD-A013371; USACSC-AT-75-04) Avail: NTIS CSCL 09/2

This report presents the results of the study to evaluate back-end data base management systems. The intent of this study has been to determine the feasibility and utility of a back-end data base management system operating in a BASOPS environment. In this document, the steps taken to make this determination are described. The data collected, the validation of the data and its source, the work performed upon this data, and the analysis of this work are detailed for each phase of the feasibility study. The principal phases of the project are the development of a functional and statistical description of a selected subprocess in the BASOPS environment; the determination of the effect of converting this subprocess to a data base management system; and the specification of a data base management system including a back-end processor and efficiency considerations of a back-end data base management system. The analyses of all phases of the project are incorporated into a set of conclusions as to the feasibility of the back-end data base management system. Future directions for study in this area are suggested. GRA

N76-14817 Michigan State Univ., East Lansing.
MATHEMATICAL FOUNDATIONS FOR RELATIONAL DATA BASES Ph.D. Thesis
Raymond Youssef Fadous 1975 96 p
Avail: Univ. Microfilms Order No. 75-27259

The problem of constructing algorithms for finding keys for relational data bases and for determining whether a relation is in second or third normal form was considered. An algorithm which starts with the functional relations and finds all keys of a normalized relation is presented. The mathematical properties of a relation in second and third normal forms are studied in detail along with the properties of prime and non-prime attributes and algorithms are given for determining whether a relation is in either second or third normal form. Finally, data point to a weakness in the definitions of a relation in third normal form, as proposed by Codd and Kent, and advances the concept of a canonical normal form to overcome the disclosed weakness. Dissert. Abstr.

N76-14828# National Bureau of Standards, Washington, D.C. Systems and Software Div.
EXPLORING PRIVACY AND DATA SECURITY COSTS. A SUMMARY OF A WORKSHOP
John L. Berg Aug. 1975 38 p
(COM-75-11113/8; NBS-TN-876; LC-75-600063) Avail: NTIS HC $4.00 CSCL 09B

On February 20, 1975, nine informed EDP professionals were invited by the Systems and Software Division of the Institute for Computer Sciences and Technology to discuss the costs Federal agencies should anticipate in complying with the Privacy Act of 1974. The invitees came from Federal agencies, private industry, and academe and shared an interest in the three questions posed by the day's agenda: (1) What benefits or increased value will EDP managers or data base administrators gain from implementing privacy requirements; (2) What direct or hidden costs can be identified and what processes can be used to identify costs; (3) How should costs be allocated among those who receive privacy's benefits or face its obligations? GRA

N76-14829# Naval Postgraduate School, Monterey, Calif.
GENERALIZED APPROACH FOR EVALUATING DATA BASE ORGANIZATION AND INDEXING METHODS M.S. Thesis
Rodolfo Mendiola Claudio Jun. 1975 54 p refs
(AD-A013628) Avail: NTIS CSCL 09/2

This paper is a study of data base organization and indexing methods with emphasis on the evaluation process. The approach of the study is focused on the data structure, a major characteristic of data base. Other aspects of the subject, indexing, for example, were discussed in relation to data structure. It was found that completeness and lucidity of knowledge of data base organization and indexing methods is necessary if one is to do a good job of evaluating a data base system. GRA

N76-14830# Optimum Computer Systems, Inc., New York.
AN EVALUATION OF A CRYPTANALYTIC TECHNIQUE FOR THE RETRIEVAL OF ENGINEERING DATA Final Report, Jan. 1974 - Mar. 1975
J. S. Nadan, Homi Cooper, and Stan S. Shoneman Mar. 1975 86 p
(Contract DAAA21-74-C-0642; DA Proj. 1E8-65803-M-728)
(AD-A013810; Rept-700) Avail: NTIS CSCL 09/2

A program for the evaluation of selected cryptanalytic techniques for the retrieval of engineering data was conceived, designed and made ready for implementation. Utilization of cryptanalytic techniques allow the engineer to access a highly structured, fixed format data base via a free format English-language input query. Due to limited funds this test was not completed during this contract. Author (GRA)

N76-18212* Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A RELATIONAL DATA BASE IMPLEMENTED USING MBASIC
R. M. Smith *In its* The Deep Space Network 15 Dec. 1975 p 291-305 refs
CSCL 09B

The bibliography of worldwide research includes the various aspects of computer information security and computer privacy, including personal privacy, reliability of security procedures, natural disasters, audits, electronic crime, and software design for efficiency checks. (This updated bibliography contains 182 abstracts, 24 of which are new entries to the previous edition.) GRA

N76-18808 Northwestern Univ., Evanston, Ill.
MODELS FOR GRAPHICALLY-ENHANCED DATA BASE MANAGEMENT SYSTEM DESIGN Ph.D. Thesis
Wayne Dennis Dominick 1975 224 p
Avail: Univ. Microfilms Order No. 75-29814

The overall objective of this research is to formulate comprehensive and generalized methodologies for the design of a graphically-enhanced data base management system which is both maximally data independent and terminal device independent, and thereby develop the theory and the models which have general applicability to data independent, structurally extensible and application extensible data base management system design and to device independent graphics system design, as well as to their combined and integrated usage. The research methodology consists of the development of four basic design models: the logical data, the user language, the physical storage, and the display. Each of the design models is contrasted with existing techniques and, in each case, is shown to be a significant extension of the current state of the art. Dissert. Abstr.

N76-18827* Lockheed-California Co., Burbank.
AN INTERACTIVE GRAPHICS PROGRAM TO RETRIEVE, DISPLAY, COMPARE, MANIPULATE, CURVE FIT, DIFFERENCE AND CROSS PLOT WIND TUNNEL DATA
Robert D. Elliott, Norbert M. Werner, and William M. Baker *In* NASA. Langley Res. Center Appl. of Computer Graphics in Eng. 1975 p 297-324
CSCL 09B

The Aerodynamic Data Analysis and Integration System (ADAIS), developed as a highly interactive computer graphics program capable of manipulating large quantities of data such that addressable elements of a data base can be called up for graphic display, compared, curve fit, stored, retrieved, differenced, etc., was described. The general nature of the system is evidenced by the fact that limited usage has already occurred with data bases consisting of thermodynamic, basic loads, and flight dynamics data. Productivity using ADAIS of five times that for conventional manual methods of wind tunnel data analysis is routinely achieved. In wind tunnel data analysis, data from one or more runs of a particular test may be called up and displayed along with data from one or more runs of a different test. Curves may be faired through the data points by any of four methods, including cubic spline and least squares polynomial fit up to seventh order. Author

N76-18829* Cornell Univ., Ithaca, N.Y.
COMPUTER GRAPHICS IN ARCHITECTURE AND ENGINEERING
Donald P. Greenberg *In* NASA. Langley Res. Center Appl. of Computer Graphics in Eng. 1975 p 355-359

CSCL 09B

The present status of the application of computer graphics to the building profession or architecture and its relationship to other scientific and technical areas were discussed. It was explained that, due to the fragmented nature of architecture and building activities (in contrast to the aerospace industry), a comprehensive, economic utilization of computer graphics in this area is not practical and its true potential cannot now be realized due to the present inability of architects and structural, mechanical, and site engineers to rely on a common data base. Future emphasis will therefore have to be placed on a vertical integration of the construction process and effective use of a three-dimensional data base, rather than on waiting for any technological breakthrough in interactive computing. Y.J.A.

N76-16834* Boeing Computer Services, Inc., Seattle, Wash.
COMPUTER GRAPHICS FOR MANAGEMENT: AN ABSTRACT OF CAPABILITIES AND APPLICATIONS OF THE EIS SYSTEM
Barry J. Solem *In* NASA. Langley Res. Center Appl. of Computer Graphics in Eng. 1975 p 427-446

CSCL 09B

The Executive Information Services (EIS) system, developed as a computer-based, time-sharing tool for making and implementing management decisions, and including computer graphics capabilities, was described. The following resources are available through the EIS languages: centralized corporate/gov't data base, customized and working data bases, report writing, general computational capability, specialized routines, modeling/programming capability, and graphics. Nearly all EIS graphs can be created by a single, on-line instruction. A large number of options are available, such as selection of graphic form, line control, shading, placement on the page, multiple images on a page, control of scaling and labeling, plotting of cum data sets, optical grid lines, and stack charts. The following are examples of areas in which the EIS system may be used: research, estimating services, planning, budgeting, and performance measurement, national computer hook-up negotiations. Y.J.A.

N76-16849# California Univ., Berkeley. Lawrence Berkeley Lab.
DESIGN TOOLS FOR DATA HANDLING SYSTEMS
G. Ringland 31 Jan. 1975 18 p refs Presented at the Assoc. for Computing Machinery Conf., Washington, D. C.
(Contract W-7405-eng-48)
(LBL-3655; Conf-750229-2) Avail: NTIS HC $3.50

Complex data bases are now routinely accessed on line. Proper design of access procedures is vital to insuring the security of the data and that it can be recovered if necessary. The design tools discussed enable operator procedures to be charted in a way that identifies the interrelation between system recovery points and message sequences. Also described are the lower-level charts (flowcharts to describe interactive processing) used as specification for programs to be executed between recovery points. Examples are given from an order entry application. This is representative of applications which are primarily data entry and without the multitude of branching options encountered in some retrieval systems. Author (NSA)

N76-16851# California Univ., Berkeley. Lawrence Berkeley Lab.
DATA STRUCTURE CHARTING METHODS
E. Hart and G. Ringland 31 Jan. 1975 17 p refs Presented at the Assoc. for Computing Machinery Conf., Washington, D. C.
(Contract W-7405-eng-48)
(LBL-3659; Conf-750229-1) Avail: NTIS HC $3.50

The growing importance of data base implementations, and the consequent need for describing interrelations between data elements, has highlighted the lack of tools for describing data structures. The paper describes, with examples, a charting method which was used successfully on a number of large projects. The important features are the compactness of charting methods, which enables large and complex structures to be understood, and the ability to represent also detailed structures such as the sequencing of items (occurrences) within a data element (or description). Author (NSA)

N76-16852# Oak Ridge National Lab., Tenn.
ON-LINE CONVERSATIONAL RETRIEVAL SYSTEM FOR ORCHIS TEXT-ORIENTED DATA BASES: USER'S MANUAL
V. A. Singletary Apr. 1975 72 p refs Revised
(Contract W-7405-eng-26)
(ORNL-4951-Rev-1) Avail: NTIS HC $4.50

This report is a user guide to the ORLOOK computer program. It includes descriptions of information files, methods of communication, program functions, control command syntax, and frequently used terminology. The program was developed as an integral part of the Oak Ridge computerized hierarchical information system (ORCHIS) to facilitate retrospective searches of online linear files. It executes in the timesharing teleprocessing environment of the IBM 360 Model 75 computer at the Oak Ridge National Laboratory. Subset files produced from its logical operations can be searched, combined, copied to online storage for subsequent ORCHIS manipulation, and transmitted to the user typewriter terminals or to the computer system printer for output. Author (NSA)

N76-16855# TRW Environmental Services, Vienna, Va.
SOURCE TEST DATA SYSTEM (SOTDAT) Final Report
Jul. 1975 15 p
(Contract EPA-68-02-1007)
(PB-245052/6; EPA-450/3-75-070; Rept-96005-003) Avail: NTIS HC $3.50 CSCL 05B

The SOTDAT System permits the gathering of source test data from many places and their storage in a computer-accessible data bank in a common format. SOTDAT is designed so that each record describes, in detail, one run of a stack test. Variables included are most of those which enter into the normal stack test calculations, as well as some which will be necessary to future users of SOTDAT. Information stored in SOTDAT contains an adequate number of source parameters and concentrates heavily on data describing a specific test run. Since each SOTDAT record is keyed to a record in the National Emissions Data System (NEDS), any required source parameters are readily available from a NEDS listing. GRA

N76-16860# Defense Dept., Washington, D.C.
FEATURE ANALYSIS OF CODASYL DATA BASE
Tom Warren 25 Jun. 1975 114 p refs
(AD-A014972) Avail: NTIS CSCL 09/2

The CODASYL specifications, it is generally assumed, represent currently the most viable approach towards developing commonality among data base management systems. Though it is still a long way from becoming a standard, implementations based on the CODASYL specifications may significantly diminish the problems associated with data base sharing and portability of programs between heterogeneous computer systems, problems which are becoming more prevalent with the advent of computer networking. This report will look in detail at four systems of the CODASYL family. Their features will be outlined to allow a judgement on the commonality that exists with the CODASYL approach. The four systems are DBMS-10, available from Digital Equipment Corporation on the PDP-10; IDMS, marketed by the Cullinane Corporation and running primarily on IBM equipment; DMS 1100, a Univac product on the 1100 series; and EDMS by Xerox, implemented on its Sigma and 560 series. GRA

N76-17836 Pennsylvania Univ., Philadelphia.
DATA STORAGE DECISIONS FOR LARGE DATA BASES Ph.D. Thesis
Jay-Louise Weldon 1975 272 p
Avail: Univ. Microfilms Order No. 76-3229

A systematic methodology for making configuration decisions for large data bases is presented. For each phase of the methodology, informational and operational decision aids are provided. The primary design tool described is an interactive data base configuration model (DBCM). This model was developed to aid the data base designer in evaluating and comparing the cost and performance of alternative configurations. The methodology is illustrated by its application to the configuration of a large data base: the 1970 Census of Population and Housing. Dissert. Abstr.

N76-18799 California Univ., Los Angeles.
A NEW COMPUTER CRYPTOGRAPHY: THE EXPANDED CHARACTER SET (ECS) CIPHER Ph.D. Thesis
Charlie Edmund Neat 1975 325 p
Avail: Univ. Microfilms Order No. 76-3048

A cryptographic technique, the ECS Cipher was developed for the privacy protection of programs and data in computer systems. The ECS Cipher is a new multisubstitution (MS) cipher that provides each cipher user with the capability of controlling the privacy protection for his programs and data. The algorithms for ECS encipherment, decipherment, and decryption are presented, and the ECS Cipher implementation is described. The encipherment and decryption performances of the ECS Cipher and the costs incurred by both cipher user and intruder are discussed. To obtain a reduction in computer system overhead when using the ECS Cipher, a data set assignment algorithm (DSAA) was developed which reduces the total seek time for ECS Ciphered data sets in sequential storage. An example of using the DSAA to assign data sets within a sequential store is presented. Dissert. Abstr.

N76-19824# Inco, Inc., McLean, Va.
TOSS COMMON USER CAPABILITY Final Technical Report
Lelia Irby, Leon Marcus, Marianne Russek, and Karen Hsing
Jul. 1975 27 p
(Contract F30602-74-C-0116; AF Proj. 4594)
(AD-A015762; RADC-TR-75-186) Avail: NTIS CSCL 09/2

The TOSS Common User Capability addresses the need to make user communication with large structured files of data as simple and logical as possible by providing interactive interface between the TOSS Information Management System (TIMS) and a user who is more familiar with his data base than he is with the mechanics of programming and file manipulation. The specific areas of data base management incorporated in the TOSS Common User Capability are file data definition, updating a data base, querying a data base, and generating formatted reports of file data. User language access to data management functions is primarily in the form of a simple dialogue conducted at his terminal, in which the user's commands and responses are prompted by the system. GRA

N76-20837# Michigan Univ., Ann Arbor. Graduate School of Business Administration.
EVALUATION AND SELECTION OF FILE ORGANIZATION THROUGH ANALYTIC MODELING
S. B. Yao (Purdue Univ.) and A. G. Merten 1975 25 p refs
(Contract MDA903-74-C-0300)
(AD-A015934; AFOSR-75-1294TR) Avail: NTIS CSCL 09/2

In this paper, a single model and cost function is developed to characterize most of the file structures for a design problem that is automated. A file design system is developed that can be used by a file designer to select good file organizations from a large number of alternatives. This generalized model makes explicit the principles underlying data base construction. The computer program which implements the model uses analytic optimization techniques to select file organizations. GRA

N76-20848# Michigan Univ., Ann Arbor. Systems Engineering Lab.
OPTIMAL DATA BASE SCHEMA DESIGN Interim Report, Jul. 1972 - Jun. 1975
Michael F. Mitoma Aug. 1975 354 p refs
(Contract F30602-73-C-0001; AF Proj. 5581)
(AD-A018431; RADC-TR-75-175) Avail: NTIS CSCL 09/2

This report describes a methodology that will automate and optimize the logical structure of a data base for the application that it supports. The methodology consists of three mathematical models and an automated design procedure. A case study analysis is presented and a number of optimal data bases are generated and discussed. GRA

N76-22921 Syracuse Univ., N.Y.
VARYING DENSITY ARRAY, A NEW DATA STRUCTURE, AND ITS APPLICATIONS TO DATA BASE Ph.D. Thesis
Gerhard Emmerich Hoernes 1974 212 p
Avail: Univ. Microfilms Order No. 76-7905

The varying density array (VDA) data structure is described with emphasis on its applicability of data bases. Examples are cited which indicate that the VDA is sufficiently general to simulate any of the data structures in the commonly used higher level languages. Dissert. Abstr.

N76-22923 California Univ., Los Angeles.
DATA BASE DESIGN: OBJECT DISTRIBUTION AND RESOURCE-CONSTRAINED TASK SCHEDULING Ph.D. Thesis
Mary Elizabeth Loomis 1975 241 p
Avail: Univ. Microfilms Order No. 76-8999

Design methods of data base systems, with particular emphasis on the implementation of distributed data bases in networks are described. Advances in network technology and the increasing availability of networks to the data-handling population suggest use of networks in information systems. One of the advantages of networks is the capability of parallel processing. Two major problems in design of distributed data bases are studied: (1) location of information resources among processing nodes, and (2) resource-constrained scheduling of tasks with precedence relationships. Each is formulated for analytic solution by zero-one linear programming methods. Heuristics are developed for solution of each problem. Optimal solutions are used for comparison purposes in the evaluation of the heuristic solution methods. The combinatorics, computational requirements, and complications introduced by possible degeneracy generally preclude analytic solution of realistic cases of either problem. Dissert. Abstr.

N76-23864# Los Alamos Scientific Lab., N.Mex.
MUMPS CODE BUILDING PACKAGE FOR DATA-BASE MANAGEMENT
C. A. Goad Aug. 1975 27 p
(Contract W-7405-eng-36)
(LA-6065-MS) Avail: NTIS HC $4.00

The MUMPS code-building package described in this report is a collection of MUMPS-11 codes which, given logical specifications set up by a user, automatically construct MUMPS programs. The programs built by the package accomplish various data-base manipulation tasks, such as user interrogation and the searching, sorting, and listing of data stored in MUMPS globals. The programs may be used to construct codes useful for listing records from a file. An example cited is a hospital patient data file. ERA

N76-24914# Stanford Research Inst., Menlo Park, Calif.
AN INTERLISP RELATIONAL DATA BASE SYSTEM
Stephen Weyl Nov. 1975 40 p
(Contract N00014-71-C-0210)
(AD-A018962; SRI-TN-11) Avail: NTIS CSCL 09/2

This report describes the file system for the experimental large file management support system currently being implemented at SRI. INTERLISP, an interactive, development-oriented computer programming system, has been augmented to support applications requiring large data bases maintained on secondary store. The data base support programs are separated into two levels: an advanced file system and relational data base management procedures. The file system allows programmers to make full use of the capabilities of on-line random access devices using problem related symbolic primitives rather than page and word numbers. It also performs several useful data storage functions such as data compression, sequencing, and generation of symbols which are unique for a file. GRA

N76-24922# Naval Ship Research and Development Center, Bethesda, Md.
USER INTERFACES TO DATABASE MANAGEMENT SYSTEMS
David K. Jefferson Sep. 1975 14 p refs Presented at the 14th Ann. Tech. Symp., Washington, D. C., Ch. of the ACM, Gaithersburg, Md., 19 Jun. 1975 Revised
(TF53531009)
(AD-A019654; DTNSRDC-4751-Rev) Avail: NTIS CSCL 09/2

Users of database management systems are divided into four groups: databases administrators, programmers, parametric users, and casual users. The interfaces between user and system are divided into three groups: data-oriented, procedure-oriented, and problem-oriented. Two logical models of interfaces are described and evaluated: the network model and the relational model. An extended example is used to demonstrate advantages of each model. Efficiency of implementation is considered, particularly in regard to future hardware developments.
Author (GRA)

N76-25809# Joint Inst. for Nuclear Research, Dubna (USSR).
TIME-TO-DIGITAL CONVERTER OF INTEGRATED CIRCUITS
Yu. M. Valuev, V. M. Grebenyuk, and V. G. Zinov 1975 12 p refs In RUSSIAN
(JINR-P13-8890) Avail: ERDA Depository Libraries HC $4.00

A digitron of start-stop type designed by using integrated circuits is described. A distinction of this device consists in the presence of a register which digitally sets the duration of a maximal measured time range, and a register of auxiliary information. The maximum frequency of the series generator is 170 MHz. The maximum channel number is 1020. Author (ERA)

N76-25818# Honeywell Informations Systems, Inc., Minneapolis, Minn.
GCOS/MULTICS FILE TRANSFER TOOL Final Report, Mar. - Sep. 1975
Stanley Curtis Vestal and Henry Nirsberger Dec. 1975 157 p
(Contract F30602-75-C-0162; AF Proj. 5550)
(AD-A019748; RADC-TR-75-312) Avail: NTIS CSCL 09/2

The effort described in this report consisted of enhancements to the GCOS/Multics File Transfer Facility which was developed under contract. The facility provides for the transfer of data files from the GCOS environment to the Multics environment. In particular, data base and file backup facilities, performance monitoring instrumentation, and Inner Ring Program/Data Protection have been added. GRA

N76-25823# Stanford Univ., Calif. Dept. of Computer Science.
AN OVERVIEW OF PRODUCTION SYSTEMS
Randall Davis and Jonathan King Oct. 1975 43 p refs
(Contracts DAHC15-73-C-0435; PHS-HS-01544; ARPA Order 2494)
(AD-A019702; SU-STAN-CS-75-524; SU-AIM-271) Avail: NTIS CSCL 09/2

Since production systems were first proposed in 1943 as a general computational mechanism, the methodology has seen a great deal of development and has been applied to a diverse collection of problems. Despite the wide scope of goals and perspectives demonstrated by the various systems, there appear to be many recurrent themes. This paper is an attempt to provide an analysis and overview of those themes, as well as a conceptual framework by which many of the seemingly disparate efforts can be viewed, both in relation to each other, and to other methodologies. Accordingly, the authors use the term 'production system' in a broad sense, and attempt to show how most systems which have used the term can be fit into the framework. The comparison to other methodologies is intended to provide a view of PS characteristics in a broader context, with primary reference to procedurally-based techniques, but with reference also to some of the current developments in programming and the organization of data and knowledge bases. GRA

N76-26875 Texas A&M Univ., College Station.
OPTIMAL DESIGN OF FILES FOR TRANSACTION ORIGINATED DATA BASE SYSTEMS Ph.D. Thesis
Kurt Alan Schember 1975 106 p
Avail: Univ. Microfilms Order No. 76-12691

The lack of an existing file design methodology for data base systems is established. A file design procedure for a class of transaction oriented data base systems is then developed. An enumerative algorithm is described. This algorithm involves rearrangement of a data element -- query set matrix to locate clusters of data elements, thereby significantly reducing the number of possible file designs without eliminating optimal designs. The reduced solution space is then systematically searched for the optimal design. Additionally, a programmed solution of the algorithm is presented to demonstrate the utility of the concept. Several sample data bases are described and analyzed.
Dissert. Abstr.

N76-26882# California Univ., Berkeley.
HARDWARE AND SYSTEM ARCHITECTURE FOR A VERY LARGE DATABASE
R. Healey and B. Heckman Aug. 1975 4 p refs Presented at the Conf. on Very Large Databases, Framingham, Mass.
(Contract W-7405-eng-48)
(LBL-4233; Conf-750974-1) Avail: NTIS HC $4.00

Practical experience in structuring a large amount of data is described. The architecture for structuring the data base for online devices and making the retrieval as efficient as possible is explained. ERA

N76-27268* Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. DSN Systems Engineering Office.
A DISTRIBUTED DATA BASE MANAGEMENT CAPABILITY FOR THE DEEP SPACE NETWORK
A. I. Bryan *In its* The Deep Space Network 15 Jun. 1976 p 32-36 ref
CSCL 09B

The Configuration Control and Audit Assembly (CCA) is reported that has been designed to provide a distributed data base management capability for the DSN. The CCA utilizes capabilities provided by the DSN standard minicomputer and the DSN standard nonreal time high level management oriented programming language, MBASIC. The characteristics of the CCA for the first phase of implementation are described. Author

N76-27891# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences Management.
ASAP TO REL: EFFICIENT RELATIONAL DATA BASES FROM VERY LARGE FILES Interim Report
O. Peter Buneman and Howard L. Morgan Jan. 1975 20 p refs
(Contracts N00014-67-A-0216-0007; NR Proj. 049-272; NR Proj. 049-360)
(AD-A020648; Rept-75-01-06) Avail: NTIS CSCL 05/2

Recently, several very powerful interactive question answering systems have become available. In general, these systems permit the user to pose questions in English or some formal language and will perform searches through a data base which is structured as a set of relations. These searches may involve deductive or inferential logic ability. There are two major difficulties which inhibit the widespread use of such systems. First, these systems typically deal only with a 'small' number of relations, e. g., less than 1,000,000. The data bases which we wish to query in real life are usually much larger. Second, the creation of the relational data base itself is often quite time consuming. In this paper, the problem is discussed of taking a very large data base stored in conventional rectangular form, i.e., all data elements dealing with one entity (name, address, phone, balance, for example) which are stored contiguously, selecting a subset of interest, and reformatting it into a relational data base which can be used by a question answering system. GRA

N76-27898# Cornell Univ., Ithaca, N.Y. Dept. of Operations Research.
MATHEMATICAL TECHNIQUES FOR EFFICIENT RECORD-SEGMENTATION IN LARGE SHARED DATA BASES
Mark J. Eisner and Dennis G. Severance Jul. 1975 36 p refs
(Contract N00014-75-C-1119; Grants NSF GK-42081; NSF GK-32282)
(AD-A020377; TR-261) Avail: NTIS CSCL 09/2

To minimize the average cost of retrieval from a large shared data base, it is desirable to partition the data items stored within each record into a primary and secondary record segment. Three alternative analytic models, based upon knowledge of data item lengths, transportation costs and retrieval patterns, are developed here to assist an analyst with this assignment problem. First, assuming a known constant of proportionality, k, between the cost of primary segment storage and the value of user satisfaction, the problem is formulated in terms of network flows and solved using the Ford Fulkerson Algorithm. Because a precise determination of k is often difficult, the problem is restated parametrically and solved once again for all possible values of k. It is discovered that as the value of a small primary segment increases from zero, sucessive optimal primary assignments are nested i.e., there is a well defined order in which data items are forced from the primary into the secondary segment. Lastly, a more complex total system cost is proposed as a design objective function. The resulting problem is determined to be a member of the class of bicriterion programming problems. A quick method of approximating an optimal solution is devised. In the event that suboptimality is unacceptable, the problem structure permits the use of an efficient branch and bound enumeration to locate an exact solution. GRA

N76-28828 California Univ., Berkeley
STORAGE STRUCTURES FOR RELATIONAL DATA BASE MANAGEMENT SYSTEMS Ph.D. Thesis
Gerald David Held 1975 126 p
Avail: Univ. Microfilms Order No. 76-15211

Storage structures are examined which allow efficient access to information in a relational data base management system. The major areas investigated are: (1) storage structures for data relations, (2) storage structures for auxiliary information to speed access to data, and (3) a strategy for selecting structures based on query statistics. A generalized directory structure is defined and is shown to provide better performance than either normal directories or simple order preserving functions. Secondary indexes on functions of attributes are introduced and a method for reusing aggregation information is presented. A general strategy for making storage structure choices is presented. The query model is extended to provide more accurate choice of key domains. The strategy selects data relation storage structures, primary key domains, and auxiliary structures. Dissert. Abstr.

N76-28831 California Univ., Berkeley
EFFICIENT RETRIEVAL IN RELATIONAL DATA BASE SYSTEMS Ph.D. Thesis
Robert Mark Pecherer 1975 90 p
Avail: Univ. Microfilms Order No. 76-15335

For a conventional digital computer and a simple, uniform storage representation for relations, a variety of techniques are presented for performing these evaluations efficently. A subset of four operators is shown to provide sufficient relation-defining capability to be considered as a retrieval language. The efficient evaluation of all expressions over these operators and any fixed set of data base relations is explored. Algorithms for the application of each operator are provided whose running times are asymptotically as good or better than previously known solutions. In addition, conditions are described for achieving further speed-up for two of the operators. Procedures for each of the four operators permit the evaluation of any such algebraic expression through recursive application of operators to data base relations and the intermediate results of the computation. A correspondence is established between an expression and a class of iterative procedures which evaluate the expression without the use of intermediate relations. Algorithms are given to select that procedure whose running time is minimal or expected minimal within any class. Dissert. Abstr.

N76-28832 California Univ., Berkeley
CUPID: A GRAPHICS ORIENTED FACILITY FOR SUPPORT OF NON-PROGRAMMER INTERACTIONS WITH A DATA BASE Ph.D. Thesis
Nancy Harriet McDonald 1975 178 p
Avail: Univ. Microfilms Order No. 76-15298

CUPID (Casual User Pictorial Interface Design) is a facility designed to support non programmer interactions with a data base system. It is a front-end user interface for the relational data base system, INGRES, and compiles 'pictures' into the query language, QUEL supported by INGRES. CUPID's data sublanguage and its definition capability are discussed. The data sublanguage is complete, high level and picture oriented, depending almost entirely on 'menumove' operations on a CRT terminal. Hence, users have no need to type extensive English text and difficult natural language processing can be completely avoided. The feasibility of a picture query language is analyzed and the working implementation and design for extension of the system is described. In conjunction with the prototype implementation, a human factors experiment was designed and conducted to compare the CUPID system to the more formal language, QUEL. This experiment is described and the results discussed. Dissert. Abstr.

N76-29942# Army Electronics Command, Fort Monmouth, N.J.
THE INTERACTIVE COMPUTER NETWORK GRAPHICS SYSTEM Final Report
Courtenay B. Clifford Mar. 1976 18 p refs
(AD-A022022; ECOM-4393) Avail: NTIS CSCL 09/2

The Interactive Computer Network Graphics System is a minicomputer based project control network information system using interactive graphics techniques. The system was developed to prove the feasibility of developing a program that displays images of PERT Networks from an existing data base and then allows editing of that data base. The system has the capability to edit the data base and perform PERT-like analysis of the results giving the user feedback about the effect of his changes. Full size plots of the network can be produced. This report described the changes and improvements made in the Phase II development effort. Author (GRA)

N76-30821*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
LUMIS INTERACTIVE GRAPHICS OPERATING INSTRUCTIONS AND SYSTEM SPECIFICATIONS
Nevin A. Bryant, Tong C. Yu, and Albert J. Landini 15 Aug. 1976 101 p ref
(Contract NAS7-100)
(NASA-CR-148764; JPL-SP-43-31) Avail: NTIS HC $5.50 CSCL 09B

The LUMIS program has designed an integrated geographic information system to assist program managers and planning groups in metropolitan regions. Described is the system designed to interactively interrogate a data base, display graphically a portion of the region enclosed in the data base, and perform cross tabulations of variables within each city block, block group, or census tract. The system is designed to interface with U. S. Census DIME file technology, but can accept alternative districting conventions. The system is described on three levels: (1) introduction to the systems's concept and potential applications; (2) the method of operating the system on an interactive terminal; and (3) a detailed system specification for computer facility personnel. Author

N76-32860 Purdue Univ., Lafayette, Ind.
DATA BASE ORGANIZATION: AN ACCESS AND STORAGE METHOD Ph.D. Thesis
Sukumaran K. C. Subas 1975 197 p
Avail: Univ. Microfilms Order No. 76-20410

The design of access and storage schemes for a data base system is considered. A new version of the doubly-chained Multiple Attribute Tree (MAT) organization is proposed and its effectiveness evaluated. This work focuses on on-line systems and the retrieval of records for queries specifying values for several attributes. The three different aspects of the retrieval process are identified and taken into account in the effort to minimize the expected retrieval time per query. A novel feature of the method is the use of the MAT storage organization to hierarchically cluster the records within the data pages. This leads to a substantial reduction in the expected number of data pages that need be retrieved per query. Several real-life and generated data bases are used to demonstrate the effectiveness of the method in reducing the expected retrieval time per query. Dissert. Abstr.

N76-32862 California Univ., Los Angeles.
STUDIES IN THE COMPUTER-AIDED DESIGN OF CONNECTED SURFACES Ph.D. Thesis
Larry Ben Lichten 1976 286 p
Avail: Univ. Microfilms Order No. 76-20265

The specification, development, application, and partial implementation of a language and specialized data base management system was developed to create and utilize relationships between surfaces describing the exteriors of objects. The resulting system illustrates a computer approach to some of the problems of topological connectivity of surface elements used in the computer-aided design of aircraft, ships, and

automobiles. A numerical geometry system for aircraft design was chosen as a basis for this study. Extensions to this geometrical data base's capabilities are described, including data structures and operators necessary to deal with connectivity problems.
Dissert. Abstr.

N77-10806# Michigan Univ., Ann Arbor. Graduate School of Business Administration.
TOWARDS THE DEVELOPMENT OF PRIMITIVES FOR DATA BASE PROCEDURES TRANSLATION Interim Report, 1 Jul. 1974 - 30 Jun. 1975
Steve Schindler and Eric Kintzer Jun. 1975 37 p refs
(Contract DCA100-72-C-0019; ORA Proj. 011067)
(AD-A023842; Working-Paper-901) Avail: NTIS HC A03/MF A01 CSCL 09/2

There is a significant problem of translating data and software across computer systems. When data is translated across systems it is likely to be changed in format and/or structure to conform to the new environment. This change may significantly complicate the process of translating the applications software that operates on the data. This paper discusses the concept of producing equivalent data base procedure operation to facilitate applications software translation. GRA

N77-11806# Stanford Univ., Calif. Dept. of Industrial Engineering.
COMPUTER GRAPHICS APPLICATIONS IN TRANSPORTATION INFORMATION SYSTEMS
Frank B. Wingate Aug. 1975 36 p
(Grant UMTA-CA-11-0008)
(PB-254795/8; RR-23; UMTA-CA-11-0008-75-1) Avail: NTIS HC A03/MF A01 CSCL 09C

Primary emphasis was placed on development of a graphics application package to control the existing transit information system. Other areas of investigation included operator interaction with the computer display; sorting and searching a large geographic data base; and the practical limitations of geographic displays on a CRT. The U.S. Census Bureau's DIME data base was analyzed, and an interactive graphics map editor was developed. GRA

N77-11808# Michigan Univ., Ann Arbor. Systems Engineering Lab.
DATA STRUCTURES: SPECIFICATION AND REALIZATION Interim Report, 1 Oct. 1975 - 1 Jan. 1976
Francois Marc Bancilhon and Keki B. Irani Griffiss AFB, N. Y. RADC Mar. 1976 251 p refs
(Contract F30602-76-C-0029; AF Proj. 5581)
(AD-A024396; RADC-TR-76-68) Avail: NTIS HC A12/MF A01 CSCL 09/2

A general model for the study of data structures is presented. The model is structured by the introduction of a notion of equivalence between relational configuration and a notion of realization of a relational schema by an access-path schema. A specific example of a data structure problem is presented, showing the value of the model and the practical interest of defined concepts. GRA

N77-12729# Computer Sciences Corp., Falls Church, Va.
EXPERIMENTAL TEST CONCEPT FOR A CARGO DATA INTERCHANGE SYSTEM (CARDIS). VOLUME 1: TEXT Final Report, May 1975 - Apr. 1976
C. Ruthling, W. Penrose, and M. Wall May 1976 60 p
(Contract DOT-TSC-1026-1)
(PB-256822/8; DOT-TSC-OST-76-25-1-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 17B

The recommended CARDIS experimental test system functional capabilitites are explored. The CARDIS functions that are inherent to an information exchange capability and optional systems which are required by the transportation related industries are identified. The criteria to evaluate the various system functions selected for implementation by test participants are included as are the CARDIS test objectives. GRA

N77-12730# Computer Sciences Corp., Falls Church, Va.
EXPERIMENTAL TEST CONCEPT FOR A CARGO DATA INTERCHANGE SYSTEM (CARDIS). VOLUME 2: APPENDIXES Final Report, May 1975 - Apr. 1976
C. Ruthling, W. Penrose, and M. Wall May 1976 147 p
(Contract DOT-TSC-1026-2)
(PB-256823/6; DOT-TSC-OST-76-25-2-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 17B

This research is concerned with various aspects of systems theory. Topics covered include: modelling and identification, linear and non-linear filtering, filtering for systems with time delay, stochastic and adaptive control, infinite dimensional systems. Applications of this work to various aerospace problems are indicated. Author (GRA)

N77-12736# Army Construction Engineering Research Lab., Champaign, Ill.
DEVELOPMENT OF THE MILITARY CONSTRUCTION DATA SYSTEM (MCDS), PART 2
Willima H. Stallhorn, Kin-Man Chung, and William Wong Apr. 1976 46 p refs
(DA Proj. 4A7-62719-AT-01)
(AD-A024938; CERL-IR-P-66-Pt-2) Avail: NTIS HC A03/MF A01 CSCL 05/2

Three major activities in the on-going development of the Military Construction Data System are described. A revised structure for the data dictionary/directory is presented and the function of its various components explained. An experiment is described in which the contents of two data files maintained under the SYSTEM 2000 data base management software are transferred to a RAMIS insulation. Finally a test interface between the MCDS data base and an independent application program is discussed. Recommendations fo near-term development include the maintenance of selected 'live' data files and provision of retrieval services for users. Author (GRA)

N77-13663 British Library Lending Div., Boston Spa (England).
THE SIGNIFICANCE AND TASKS OF DATA COMMUNICATION
Dieter Letsche May 1976 15 p ref Transl. into ENGLISH from Nachrtech. Z. (Brunswick), v. 3, no. 29, 1976 p 211-214
(BLL-Trans-3371-(9022.81)) Avail: British Library Lending Div., Boston Spa, Engl.

Data communication is a prerequisite for decentralized data processing. The utilization of computer capacity and the possibility of access to information banks give rise to a great demand for data communication. The increase in the productivity of industry and public administration is vitally dependent on the extent to which computer capacity and data can be made available at every place of work. Author

N77-13664 Stanford Univ., Calif.
USE OF META LEVEL KNOWLEDGE IN THE CONSTRUCTION AND MAINTENANCE OF LARGE KNOWLEDGE BASES Ph.D. Thesis
Randall Davis 1976 266 p
Avail: Univ. Microfilms Order No. 76-25988

The MYCIN system, designed to assist in the task of diagnosis and the therapy selection for infectious diseases, was used for this project. The two major goals set were to make it possible for an expert in the domain of application to 'educate' the consultation program directly, and to make it possible to assemble and maintain large amounts of knowledge. The central theme of this work was the exploration and use of meta level knowledge which makes possible a system which has both the capacity to use its knowledge directly, and the ability to examine it, abstract it, and direct its application. Efforts to enable a program to explain its actions, by giving it a model of its control structure, and an understanding of its representations are described. The use of abstracted models of knowledge (rule models) as a guide to acquisition is documented. The utility of describing to a program the structure of its knowledge base (using data structure schemata) is demonstrated. Finally, the use of strategies in the form of meta rules, which contain knowledge about the use of knowledge, is described. Dissert. Abstr.

N77-13675# Michigan Univ., Ann Arbor. Dept. of Industrial and Operations Engineering.

A THEORETICAL ANALYSIS ON DATA DEFINITION AND TRANSLATION Final Report
A. G. Merten 1976 15 p refs
(Contract AF-AFOSR-2219-72; AF Proj. 9769)
(AD-A025199; AFOSR-76-0556TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

Over the past four years of research for AFOSR, considerable progress has been made toward development of a data translation methodology. A model for implementing data translators has been formulated and verified through a series of increasingly more general data-translators. Mechanisms for prescribing stored-data transformations and descriptions, a Stored-Data Definition Language, and Translation Definition Language to direct the data translator have developed. Author (GRA)

N77-14788# Logicon, Inc., San Diego, Calif.
ADAPT I UNIFORM DATA LANGUAGE (UDL): A PRELIMINARY SPECIFICATION Interim Report, 1 May - 1 Aug. 1976
M. E. Solegied 23 Jul. 1976 123 p
(Contract N00014-76-C-0899)
(AD-A027580) Avail: NTIS HC A06/MF A01 CSCL 09/2

Under the ADAPT project, a prototype intelligent terminal will be developed which provides users and/or other systems a uniform interface for accessing multiple online data bases located on different systems. The underlying technology applied by ADAPT will be the transformation from one uniform data language, UDL, to other target query languages which reside on a network. ADAPT will be comprised of four phases: ADAPT I will provide the fundamental ADAPT system architecture baseline for subsequent phases and also a limited user data base query and display facility for four data base management systems. ADAPT II will provide users a data base maintenance facility for four DBMSs, as well as data display enhancements. ADAPT III will produce two production models of ADAPT, one installed in network centers and the other as a stand-alone intelligent terminal. ADAPT IV will provide a local data base manager for onsite file creation. Author (GRA)

N77-16871*# Teledyne Brown Engineering, Huntsville, Ala. Advanced Projects Div.
DATA BASE MANAGEMENT STUDY Interim Report
May 1976 62 p
(Contract NAS8-31486)
(NASA-CR-150187; APF76-MSFC-02127) Avail: NTIS HC A04/MF A01 CSCL 09B

Data base management techniques and applicable equipment are described. Recommendations which will assist potential NASA data users in selecting and using appropriate data base management tools and techniques are presented. Classes of currently available data processing equipment ranging from basic terminals to large minicomputer systems were surveyed as they apply to the needs of potential SEASAT data users. Cost and capabilities projections for this equipment through 1985 were presented. A test of a typical data base management system was described, as well as the results of this test and recommendations to assist potential users in determining when such a system is appropriate for their needs. The representative system tested was UNIVAC's DMS 1100. Author

N77-16744 Michigan Univ., Ann Arbor.
A METHODOLOGY FOR GENERALIZED DATABASE RESTRUCTURING, VOLUMES 1 AND 2 Ph.D. Thesis
Shamkant Bhalchandra Navathe 1976 484 p refs
Avail: Univ. Microfilms Order No. 76-27557

A generalized database restructuring problem independent of a specific system environment is formulated and a generalized methodology for building a restructurer to solve the problem is proposed. Dissert. Abstr.

N77-16745 State Univ. of New York, Stony Brook.
DESIGN OF A DISTRIBUTED DATA BASE MANAGEMENT SYSTEM FOR A HOMOGENEOUS DISTRIBUTED COMPUTER NETWORK Ph.D. Thesis
Harvey David Lowy 1976 248 p
Avail: Univ. Microfilms Order No. 77-242

A design is proposed of a distributed data base management system (DBMS) to operate in a homogeneous distributed computer network. Residing at each node in the network will be identical copies of our DBMS which will interface the user to the local and non-local data bases. To facilitate communication between the member data bases, a unique system file, STATUS, will be established. STATUS will contain (permanent) information describing the data bases and that (temporary) data detailing the communications between nodes. A user may remain ignorant of the existence of the network and submit requests on a logical level. The DMBS will divide the user request into local and global actions, route the individual parts through the network, record (in STATUS) completed actions and determine when the user request is satisfied. The design avoids the vulnerability of a centralized system and the inefficiency of a nonhomogeneous one at the expense of some flexibility. Dissert. Abstr.

N77-18788# Naval Ship Research and Development Center, Bethesda, Md.
COMRADE DATA STORAGE FACILITY USERS MANUAL
Michael A. Wallace, Ann E. Bandurski, and Thomas R. Rhodes Jan. 1976 85 p refs
(AD-A028276; DTNSRDC-76-0003) Avail: NTIS HC A05/MF A01 CSCL 09/2

The COMRADE Data Storage Facility (CDSF) is a FORTRAN callable subroutine package, currently operational on DTNSRDC's CDC 6700 SCOPE 3.4 computer system which facilitates a variety of data base management functions including file definition, initialization and finalization, storage, retrieval, update and deletion of variable-length data blocks, and inverted list processing and file recovery. This report includes a discussion of the role of CDSF within the COMRADE Data Management System (CDMS), and also includes a discussion of the various strategies and techniques used by CDSF during data block and inverted list operations. The use of each of the user-callable CDSF subroutines is described. Author (GRA)

N77-18773# Defense Dept., Washington, D.C.
RELATIONAL DATA MANAGEMENT
J. H. Pope 28 May 1976 50 p refs
(AD-A029892) Avail: NTIS HC A03/MF A01 CSCL 05/1

The relational model of data is being put forward by many researchers as an improved representation of data over that offered by the current generation of hierarchical and network models. The relational model purports to offer a conceptually simpler representation of data and data relationships as well as to provide a firm theoretical basis upon which to construct high-level user languages. This paper is intended both to present an introduction to the relational data model and to discuss its attendant advantages and disadvantages. Author (GRA)

N77-21125*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
COST REDUCTION POTENTIAL OF THE DSN DATA BASE
M. McKenzie *In its* The Deep Space Network 15 Apr. 1977 p 203-220 refs
Avail: NTIS HC A11/MF A01 CSCL 09B

The cost of the DSN data base can be reduced by computerizing and unifying the current multiplicity of seperate manual, computer, and hybrid data bases. Savings would accrue from eliminating all manual system costs, increasing efficiency in data base implementation and maintenance-and-operation, and increasing data accuracy. By applying a simple mathematical savings model to current data base costs, this study estimates the probable range of net ten-year savings. The minimum net savings, under the assumptions of the study, are calculated as $7.5 million. Author

N77-24787# Ohio State Univ., Columbus. Computer and Information Science Research Center.
THE ARCHITECTURE OF A DATABASE COMPUTER. PART 1: CONCEPTS AND CAPABILITIES
Richard I. Baum, David K. Hsiao, and Kannan Krishnamurthi Sep. 1976 53 p refs
(Contract N00014-75-C-0573)
(AD-A034154; OSU-CISRC-TR-76-1-Pt-1) Avail: NTIS HC A04/MF A01 CSCL 09/2

A hardware architecture for a database computer (DBC) is given in this paper. The proposed design overcomes many of the traditional problems of database system software and is one of the first to describe a complete data-secure computer capable of handling large databases GRA

N77-24788# BDM Corp., El Paso, Tex.
DATA BASE MANAGEMENT SYSTEM REFERENCE MANUAL Final Report
James M. Phelan Oct. 1976 143 p refs
(Contract F29601-74-C-0017)
(AD-A034228; AFWL-TR-75-159) Avail: NTIS HC A07/MF A01 CSCL 09/2

The Data Base Management System (DBMS) is a computer program which creates and maintains a hierarchical set of data bases and data base entries in which both the data base structure and the data itself may be defined and controlled by the user. Information stored in the data base is stored as entity attributes. These entities may be placed into ordered sets and inverted linked lists as well as being organized along the normal hierarchical lines of the data base. Information may be retrieved to core storage, system files, and output devices. Author (GRA)

N77-24793# California Univ., Los Angeles. Dept. of Computer Science.
IMAGE DATA ORGANIZATION Interim Report
A. Klinger, M. Rhodes, and J. Omolavole 1976 7 p Presented at the San Diego Biomedical Symp. 1976
(Grant AF-AFOSR-2384-72)
(AD-A034339) Avail: NTIS HC A02/MF A01 CSCL 14/3

A magnetic tape conversion program is being developed to facilitate picture processing by medium sized digital computers. The approach is to obtain a revised image format that allows sophisticated algorithms to process small contiguous areas. A tree structure is presented based on regular decomposition of two-dimensional arrays. Magnetic tape capacity parameters are reviewed and applied to develop the best tape organization for this data structure. Alternate neighbor region and partitioning regimes are described and a sample calculation discussed.
Author (GRA)

N77-24796# Naval Electronics Lab. Center, San Diego, Calif.
FORACS DATA BANK MANUAL
H. M. Blanchard 15 Oct. 1976 96 p
(AD-A033860; NELC-TD-491) Avail: NTIS HC A05/MF A01 CSCL 09/2

Fleet Operational Readiness Accuracy Check Sites (FORACS) test the performance accuracy of sensors installed aboard ships and submarines. This information is forwarded to NELC for permanent storage on magnetic tape and is subject to rapid recall with respect to desired analysis parameters. Document explains how this effort is conducted. Author (GRA)

N77-24798# Pennsylvania Univ., Philadelphia. Wharton School of Finance and Commerce.
CONVERTING FROM RECTANGULAR TO RELATIONAL DATA BASES Interim Report
David J. Root Sep. 1976 28 p refs
(Contract N00014-75-C-0462)
(AD-A034388; Rept-76-09-08) Avail: NTIS HC A02/MF A01 CSCL 09/2

This report describes a program developed for the conversion from rectangular to relational data bases. The programs intent is to facilitate loading some segment of a large rectangular file into a relational data base. Thus large rectangular files which could not easily be maintained as relational data bases could have some subset of interest loaded into a relational data base system, such as Rel English, to take advantage of the more powerful relational query languages. The inputs to the conversion routine are the subset of the rectangular file, basic information about the fields in the records, and prototype commands for loading the relational data base. The output is a file of commands for loading the records into the relational data base.
Author (GRA)

N77-24799# Pennsylvania Univ., Philadelphia. Wharton School of Finance and Commerce.
DETERMINISTIC VERSUS NONDETERMINISTIC PROCEDURE FOR AUTOMATIC PROGRAM GENERATION IN DBTG DATA BASE ACCESS
David J. Root Oct. 1976 103 p refs
(Contract N00014-75-C-0462; NR Proj. 049-272)
(AD-A034390; Rept-76-10-01) Avail: NTIS HC A06/MF A01 CSCL 09/2

As information systems grow in scope and size, costs associated with the programming activity are quickly becoming major factors in the economic feasibility of such systems. One obvious solution is to enlist the computer itself to aid in the programming activity. The form of such aid could range from interpreters to program synthesizers (automatic program generation). To date few program synthesizers have been used in real world applications due to either need for more powerful AI techniques to solve the problems involved, or to the costs of the existing AI techniques which they employ. This paper describes the work involved in minimizing the USE OF AI in one such program synthesizer, the Automatic Program Generator (APG), in its application to report generation from network (DBTG) data bases. Author (GRA)

N77-25809# Ohio State Univ., Columbus. Computer and Information Science Research Center.
THE ARCHITECTURE OF A DATABASE COMPUTER. PART 2: THE DESIGN OF STRUCTURE MEMORY AND ITS RELATED PROCESSORS
David K. Hsiao and Krishnamurthi Kannan Oct. 1976 113 p refs
(Contract N00014-75-C-0573)
(AD-A035178; OSU-CISRC-TR-76-2-Pt-2) Avail: NTIS HC A06/MF A01 CSCL 09/2

The database computer (DBC) is a specialized back-end computer which is capable of managing data of 10 to the 9th power -10 to the 10th power bytes in size and supporting known data models such as relational, network, hierarchical and attribute-based models. In addition to its intended purpose of handling large databases and interfacing with various data models, the DBC is one of the first database machines which have built-in protection mechanisms for access control and clustering mechanisms for performance enhancement. GRA

N77-25812# Defense Systems Management School, Fort Belvoir, Va.
USE ON AN INTERACTIVE COMPUTER GRAPHICS MODEL IN ARMY PROJECT PLANNING AND CONTROI
Douglas Curtis Seay Oct. 1976 42 p refs
(AD-A036186) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper discusses an interactive computer graphics model which is used by the U.S. Army's PATRIOT Project Office in planning and control functions. This simulative computer networking model, AUTONET, is able to display a variety of standard network analysis reports as well as time and cost frequency distributons(histograms) and indices of criticality (percentage of the time an item was on the critical path) for both paths and activities. One unusual feature of the AUTONET model is the tiered structure of its data base. There must be a summary level network consisting of up to 100 activities each of which may be supported at the second level by networks of up to 100 activities. Similarly there is the capability of supporting each of these second level activities by third level networks if such detail is required. Whenever information is processed at a lower level it is automatically rolled up through the appropriate parent network to the summary network. A discussion is included regarding the advantages and disadvantages of this model's use. Author (GRA)

N77-25820# System Development Corp., Santa Monica, Calif.
SOFTWARE DATA COLLECTION STUDY. VOLUME 4: DATA MANAGEMENT SYSTEM INTERFACE Final Technical Report, Jun. 1975 - Jun. 1976
M. P. Templeton Griffiss AFB, N. Y. RADC Dec 1976 79 p refs
(Contract F30602-75-C-0248)
(AD-A036065; SDC-TM-5542/004/01-Vol-4; RADC-TR-76-329-Vol-4) Avail: NTIS HC A05/MF A01 CSCL 09/2

Data collected by the RADC Data Collection and Repository System may be stored as documents and/or entered into a

data base. This document explores alternate data structures, data management systems, data storage devices, and data entry devices that may be used for the data base. General recommendations are made based on the need for flexibility, security, growth potential, and ease of implementation and use. The basic recommendations are: Data should be entered via intelligent terminals at the source. The data base should be close to the point of use which means some decentralization. Data should be stored in serial records and accessed via indexes. Data access should be through a data management system which separates the logical view of the data from the physical structure and protects the data from unauthorized access or change.
Author (GRA)

N77-28818# California Univ., Livermore. Lawrence Livermore Lab.
MONITOR OF DISTRIBUTED DATA SYSTEMS (MODDS). PART 1: DIGEST OF FUNCTIONAL SPECIFICATIONS
E. W. Birss, J. E. Donnelley, and J. W. Yeh 15 Nov. 1976 35 p
(Contract W-7405-eng-48)
(UCID-17314-Pt-1) Avail: NTIS HC A03/MF A01

An approach for improving the use of geographically distributed computer services used by the U. S. Department of Transportation/Transportation Systems Center (DOT/TSC) is described. The interactive use of these distributed services (a major portion of which are data bases) consumes increasing amounts of the DOT user-analyst's time. Accountability, selection capability, usability, and control of distributed services usage is increased by using a minicomputer as an intermediary between the user-analyst and the distributed computer services. Current problems faced by the DOT community are summarized and presented in a digest of MODDS advantages. ERA

N77-28822# Mitre Corp., Bedford, Mass.
GEOGRAPHIC DATA BASE DEVELOPMENT
A. M. Molloy Jan. 1977 186 p refs
(Contract F19628-76-C-0001)
(AD-A037118; MTR-3312; ESD-TR-76-380) Avail: NTIS HC A09/MF A01 CSCL 09/2

Project 7090, Operations/Intelligence Techniques Experimentation, has as an objective the development of data processing techniques for effective applications of intelligence data. Because information derived from intelligence data is often positional, one way to derive information is to display the data over a map background. Although map data bases for the world have already been digitized, in order that a map background be effective in an operational environment, there must be a direct relationship between the amount and types of map feature data displayed, and the scale of the display. This report discusses the issues involved in creating custom data bases and provides documentation on the set of FORTRAN routines implemented for that purpose. Author (GRA)

N77-27720# Inco, Inc., McLean, Va.
TRANSPARENT INTEGRATED INTELLIGENCE NETWORK QUERY INTERMEDIATE PROCESSOR Final Technical Report, 3 Nov. 1975 - 2 Nov. 1976
Paul Stygar, Andrew Puchrik, and Margaret Turek Jan. 1977 182 p refs Revised
(Contract F30602-76-C-0090)
(AD-A037947; RADC-TR-77-39-Rev) Avail: NTIS HC A09/MF A01 CSCL 09/2

This Final Report presents a functional design and preliminary specifications for a query language translator to provide query language transparency in an intelligence network, so that one query language may be used to access data bases which otherwise would be accessed by different query languages. Author (GRA)

N77-28797# Minnesota Univ., Minneapolis. Management Information Systems Research Center.
DIFFERENTIAL FILES: THEIR APPLICATION TO THE MAINTENANCE OF LARGE DATA BASES
Dennis G. Severance and Guy M. Lohman (Cornell Univ., Ithaca, N. Y.) Jan. 1976 23 p refs
(Contract N00014-75-C-1119)
(AD-A038200; MISRC-WP-76-05) Avail: NTIS HC A02/MF A01 CSCL 09/2

The representation of a collection of data in terms of its differences from some pre-established point of reference is a basic compaction technique which finds wide applicability. This paper describes a differential database representation which is shown to be an efficient method for storing large and volatile databases. The technique confines database modifications to a relatively small area of physical storage and as a result offers two significant operational advantages. First, because the reference point for the database is inherently static, it can be simply and efficiently stored. Moreover, since all modifications to the database are physically localized, the process of backup and the process of recovery are relatively fast and inexpensive.
Author (GRA)

N77-28808# Purdue Univ., Lafayette, Ind. Purdue Lab. for Applied Industrial Control.
SIGNIFICANT ACCOMPLISHMENTS AND DOCUMENTATION OF THE INTERNATIONAL PURDUE WORKSHOP ON INDUSTRIAL COMPUTER SYSTEMS. PART 6: GUIDELINES FOR THE DESIGN OF MAN/MACHINE INTERFACES FOR PROCESS CONTROL Final Report, 1 Feb. 1976 - 31 Jan. 1977
Jan. 1977 111 p refs 6 Vol.
(Contract N00014-76-C-0732; NR Proj. 049-388)
(AD-A038457) Avail: NTIS HC A06/MF A01 CSCL 09/2

This volume represents Part 6 of a six volume set reproducing the major work accomplished by the International Purdue Workshop on Industrial Computer Systems during the past eight years. This material is reprinted from the Minutes of the Workshop and represents some of the Work carried out by the Man/Machine Communications Committee of the Workshop. Author (GRA)

N77-28813# Ohio State Univ., Columbus. Computer and Information Science Research Center.
THE ARCHITECTURE OF A DATABASE COMPUTER. PART 3: THE DESIGN OF THE MASS MEMORY AND ITS RELATED COMPONENTS
David K. Hsiao and Krishnamurthi Kannan Dec. 1976 145 p refs
(Contract N00014-75-C-0573)
(AD-A036217; OSU-CISRC-TR-76-3) Avail: NTIS HC A07/MF A01 CSCL 09/2

This is the last of the three-part series which deals with the design of a back-end computer known as the database computer (DBC). The concepts and capabilities of the DBC were presented in Part I. Schematically, the DBC architecture consists of two loops of memories and processors, namely, the structure loop and the data loop. The structure loop is composed of four components: the structure transformation unit (KXU), the structure memory (SM), the structure memory information processor (SMIP) and the index translation unit (IXU). The design philosophy, implementation details and hardware organizations of the structure loop components were documented in Part 2. In this report, the design of the data loop is presented. In addition, the database command and control processor (DBCCP), which regulates the operations of both the structure and data loops and interfaces with the front-end computer systems, is also presented. The DBCCP processes all DBC commands received from the front-end computer systems, schedules the execution of the commands on the basis of the command type and priority, enforces security on a selective basis, clusters records to be stored in the DBC and routes the response set to the front-end computer systems. GRA

N77-29800# Rome Air Development Center, Griffiss AFB, N.Y.
CONSIDERATIONS IN THE DESIGN OF A SECURE DATA BASE MANAGEMENT SYSTEM In-House Report, May 1974 - Feb. 1976
William E. Rzepka Mar. 1977 35 p refs
(AD-A039169; RADC-TR-77-9) Avail: NTIS HC A03/MF A01 CSCL 09/2

Consideration is given to several problems encountered in the design of a secure, multilevel Data Base Management System (DBMS). The DBMS will operate within the environment of a certified, secure operating system which will implement and enforce the Department of Defense Information Security Program for protection of classified information. A set of DBMS security requirements is used as basis for design considerations, and the economic and functional impact of these requirements is assessed. Areas of consideration include: data organization and structure, operations on structured data, coordinated data sharing and data entry. On the basis of these considerations, it is concluded that relational data systems minimize the impact of the DBMS security requirements on the functional capabilities of a DBMS. These same requirements are found, however, to increase the costs of coordinated data sharing, and to present difficult problems in multilevel data entry. GRA

N77-30758 Illinois Univ., Urbana-Champaign.

CHARACTERIZATION OF A DISTRIBUTED DATA BASE SYSTEM Ph.D. Thesis

Enrique Grapa 1976 179 p
Avail: Univ. Microfilms Order No. 77-9005

Models for update synchronization are presented and extensively studied: (1) the Johnson's model, which basically assumes that updates are handled in the decentralized fashion; (2) the Bunch's model, which introduces the concept of a centralized scheme; and the reservation center model which combines various centralized and decentralized concepts. Major flaws of the models are discussed and extensions are presented to cover them. The broadcasting model, an extension of Bunch's model, is presented as a prototype of a workable generalized distributed data base system. Dissert. Abstr.

N77-30759 Stanford Univ., Calif.

A STORAGE STRUCTURE MODEL FOR DATA BASE DESIGN Ph.D. Thesis

Liselotte Vicki Tharp 1976 160 p
Avail: Univ. Microfilms Order No. 77-7176

A methodology for the design of a storage structure is proposed. The methodology is based on two models: (1) a problem definition model that describes the data model to be supported by the storage structure and statistical information about the data and the application; (2) a storage structure model from which it is possible to calculate the performance of a storage structure for a given set of applications. The methodology also includes a search strategy that can be used to find all efficient storage structures for a given set of applications. The storage structure model developed gives a description of physical sequentialities and pointer sequentialities in the stored data by means of precedence matrices which provide a convenient tool for the performance calculations. Dissert. Abstr.

N77-30760 Northwestern Univ., Evanston, Ill.

A GENERALIZED ACCESS PATH MODEL FOR RELATIONAL, HIERARCHICAL, AND NETWORK DATA BASE SYSTEMS Ph.D. Thesis

Robert Steven Kaplan 1976 101 p
Avail: Univ. Microfilms Order No. 77-10047

An Access Path Producing Language (APPLE) is developed which permits data base users to formulate completely nonprocedural queries. This simple, high level language is designed so that a user need only have minimal knowledge of the physical and logical structure of the data base being accessed. A generalized access path model is developed which permits the system to resolve APPLE queries irrespective of which data model is being used. Two major classes of access path problems associated with the generalized access path model are investigated. One class of problems involves the determination of whether or not a particular path is correct. A second class of problems deals with the resolution of ambiguous queries which can easily be expressed in APPLE. Several approaches to solving these problems are presented. Based on the results some problems in the fields of data translation and subschema/schema are identified. Dissert. Abstr.

N77-30761 State Univ. of New York, Stony Brook.

A SIMULATION MODEL FOR DATA BASE SYSTEMS Ph.D. Thesis

Peter I. Scheuerman 1976 196 p
Avail: Univ. Microfilms Order No. 77-7782

A systematic methodology is presented for the design of a simulation model which can serve as an aid in the process of selecting storage structures. The model is basically oriented toward the performance evaluation of a given system in terms of retrieval workload, with the storage utilization cost obtained as a byproduct. The different measures of performance are obtained by running a sample of queries with a specified distribution against the given logical data base, which is also of stochastic nature, and the selected file organization. Two important design principles have been the concern of the approach: (1) to allow for various levels of detail in the physical implementation (in terms of access paths, encoding to specific storage structures and device specifications) and, (2) to run the model at a reasonable cost in order to justify its practical use. Dissert. Abstr.

N77-30777# Ballistic Research Labs., Aberdeen Proving Ground, Md.

AN APPLICATION OF CREATABASE: A MODULE OF AN INTEGRATED DATA BASE ANALYSIS SYSTEM

Morton A. Hirschberg Apr. 1977 22 p refs
(AD-A039304; BRL-1979) Avail: NTIS HC A02/MF A01 CSCL 09/2

CREATABASE, a module of an integrated data base analysis system, was used to construct a data base comprised of 10,000 observations collected during 31 tests conducted at the Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland. Uses of the data base as well as other applications of CREATABASE are discussed, and the data base and the commands to implement it are also presented. Author (GRA)

N77-30782# Boeing Aerospace Co., Seattle, Wash.

SOFTWARE ERROR DATA ACQUISITION Final Technical Report, Feb. - Nov. 1976

M. J. Fries Griffiss AFB, N. Y. RADC Apr. 1977 62 p refs
(Contract F30602-76-C-0152)
(AD-A039916; RADC-TR-77-130) Avail: NTIS HC A04/MF A01 CSCL 09/2

Software error data was collected from a large DOD system development project. The errors were analyzed and put into a predefined set of categories. As part of the effort, the times to find and fix the errors were calculated, and the phase of the development project in which the errors arose was determined. Study results were also compared to results of a similar type of study performed by a second contractor who performed analysis of data from another DOD software project. This report contains a description of the hardware and software systems, the software development process, and the types of data available. Also included are descriptions of the method of categorization and the derivation of other contractually required data items. Finally, discussions are presented concerning: an interpretation of the software error categories, comments on the difficulties and successes in performing the error data collection, an analysis of the data collected by software function, study results, examination of the data by development phase, and recommendations for future software data collection studies. Author (GRA)

N77-30786# National Physical Lab., Teddington (England). Div. of Chemical Standards.

THE NPL 'MTDATA'-BANK AND ITS APPLICATION TO THERMODYNAMIC COMPUTATION ON INORGANIC AND METALLURGICAL SYSTEMS

G. P. Jones May 1977 24 p refs
(NPL-Chem-70) Avail: NTIS HC A02/MF A01

A description is given of the main principles and capabilities of NPL's Inorganic and Metallurgical Thermodynamic Data-bank 'MTDATA'. Its utility as an aid to research on reactions which may be undergone by materials at high temperatures, where equilibrium conditions are often approached, is indicated by selected examples. Author (ESA)

N77-30795# Purdue Univ., Lafayette, Ind. Inst. for Research in the Behavioral, Economic, and Management Sciences.
INFORMATION TRANSFERRAL WITHIN A DISTRIBUTED DATA BASE VIA A GENERALIZED MAPPING LANGUAGE
R. C. Bonczek, C. W. Holsapple, and A. B. Whinston Nov. 1976 39 p refs
(Contract DI-14-34-0001-6076)
(PB-267343/2; Paper-577; W77-07813; OWRT-B-080-IND(5))
Avail: NTIS HC A03/MF A01 CSCL 13B

A generalized mapping language is proposed as a mechanism for information transferral within a distributed data base, and a general data structure for supporting the mapping function is illustrated. The method accommodates a variety of user views, is independent of whether the data base is geographically distributed or centralized, furnishes a straightforward security mechanism and provides a basis for treating the contingency of uninformed or non-programming users. The realm of water quality management is used to illustrate the technique. GRA

N77-30796# Purdue Univ., Lafayette, Ind. Krannert Graduate School of Management.
AIDING DECISION MAKERS WITH A GENERALIZED DATA BASE MANAGEMENT SYSTEM: AN APPLICATION TO INVENTORY MANAGEMENT
Robert H. Bonczek, Clyde W. Holsapple, and Andrew B. Whinston Aug. 1976 32 p refs
(Contract DI-14-34-0001-6076; OWRT Proj. B-080-IND(1))
(PB-267306/9; W77-07814) Avail: NTIS HC A03/MF A01 CSCL 13B

The attributes of a generalized data base management system are examined with respect to its impact on managerial decision-making. Primary considerations are: the organization of data within data base such that all intricate relationships are represented, and the utilization of a facile method for nonprogramming users to interrogate the data base. Examples drawn from the field of material requirements planning are used to illustrate the concepts and potential of the generalized data base management system. GRA

N77-31796 Northwestern Univ., Evanston, Ill.
SECONDARY INDEXES AS ACCESS MODELS FOR RELATIONAL DATA BASE SYSTEMS Ph.D. Thesis
Ann Sigman Michaels 1976 311 p
Avail: Univ. Microfilms Order No. 77-10068

An access path model, which uses a multi-attribute secondary index as the access path structure, is introduced and an analytical performance study is conducted. It is compared with an inverted list access structure and with an unindexed relation. The multi-attribute index is associated with a partitioned storage structure for relations. In the cases of the inverted list and the unindexed relation, tuples were not assumed to be stored according to any particular organization. The unindexed relation was assumed to have no associated access structure. The multi-attribute index with its associated relation storage structure seems to produce the best overall performance. The evaluation time for data base transactions is generally comparable to or less than it is for the other two approaches, and this index requires less storage space than the inverted list index. Dissert. Abstr.

N77-31808# Computer Sciences Corp., Falls Church, Va.
A COMPREHENSIVE DATA BASE ACCESS METHODOLOGIES DESIGN GUIDE Final Report
John Emory, Sally Green, Robert Grimes, Otis Haslop, and Anupam Shah 28 Sep. 1976 331 p refs
(Contract DCA100-75-C-0028)
(AD-A041459; CSC-R493700019-2-2; CCTC-TM-123-76)
Avail: NTIS CSCL 09/2

The Comprehensive Data Base Access Methodologies Design Guide is produced to assist programmers, analysts, and data base managers in the application of state-of-the-art methodology in the use and design of data structures, access mechanisms, and management of computer processed data. The scope of the document covers the principal methods in general use today. The material has been organized for easy comprehension by relatively inexperienced personnel and provides a source for further perusal of related literature. Author (GRA)

N77-31811# Defense Documentation Center, Alexandria, Va.
SOURCE HEADER LIST Technical Report for period ending 20 Apr. 1977
Jun. 1977 800 p Supersedes DDC/TR-76/2
(AD-A041700; DDC/TR-77/2; DDC/TR-76/2) Avail: NTIS HC A99/MF A01 CSCL 05/2

Source names used by the Defense Documentation Center in the Research and Technology Work Unit Information System, and the Technical Report, Program Planning, and Independent Research and Development Data Banks are compiled alphabetically. Each of the 24,947 source names is assigned a 6-digit numeric code for computer input and retrieval, a 4-digit alphanumeric geopolitical code and a 1-digit alphanumeric type code. Author (GRA)

N77-31814# Brookhaven National Lab., Upton, N. Y.
ENERGY MODEL DATA BASE (EMDB) USING SYSTEM 2000
P. H. Newhouse Sep. 1976 22 p Presented at Assoc. of System 2000 Users for Tech. Exchange Meeting Toronto, 29 Sep. 1976
(Contract E(30-1)-16)
(BNL-21854; Conf-760989-1) Avail: NTIS HC A02/MF A01

The Energy Model Data Base (EMDB) at BNL is discussed. It contains high-quality, documented numeric data describing the technological processes which comprise the United States Energy System. The EMDB was designed as a collection of energy data to be used in an array of energy systems modeling tasks. The history and use of the EMDB are explained in a nontechnical way. ERA

N77-31820# Michigan Univ., Ann Arbor. Dept. of Industrial and Operations Engineering.
TOWARD THE DEVELOPMENT OF A DATA TRANSLATION METHODOLOGY AND SELECTION OF TARGET DATABASE STRUCTURES Final Report, 1 Jan. 1976 - 28 Feb. 1977
James P. Fry and Alan G. Merten Feb. 1977 24 p refs
(Grant AF-AFOSR-2975-76)
(AD-A041715; AFOSR-77-0782TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

Progress has been made toward development of a data translation methodology and selection of optimal target databases at the University of Michigan. A model for implementing data translators has been formulated and verified through the development of a series of increasingly general data translators. Mechanisms have been developed for prescribing logical data transformations--- Restructuring Specifications--and physical data descriptions---a Stored-Data Definition Language. Finally, results have been obtained on the evaluation, selection, and optimization of target database structures. Author (GRA)

N77-32730# Colorado Univ., Boulder. Computing Center.
CSC PLOTTING PACKAGE Final Report
J. R. Warner and K. I. Joy Nov. 1976 57 p
(Grant DAAG29-76-G-0095)
(AD-A041104; UCCC-76-21; ARO-13742.1-EL) Avail: NTIS HC A04/MF A01 CSCL 09/2

The CSC plotting package is a computer software system for generating tabular graphs from United States Army personnel information. As input, the CSC plotting package accepts a sequential file of information built using the United States Army's SIR (Selective Information Retrieval) system. As output, the package generates an annotated histogram or pie chart derived from the sequential SIR file. SIR allows users to selectively define and build a retrieval file from an information data bank. The CSC plotting package synthesizes the retrieval file in generating a customized plot. The CSC plotting package accepts simple input commands for generating the tabular plots. Graphics output may be routed to any display device that supports line drawing capabilities. The plot package is functional in both batch and time-sharing environments. The CSC plotting package is written in ANSI Standard FORTRAN IV for compatibility among computing installations. The following sections of this report detail the general configuration of the package. Four

appendices: describe the user interface (i.e., input commands); detail a sequence of example plots; describe the device-dependent graphics routines, and provide the general system schematic.
GRA

N77-32743# National Bureau of Standards, Washington, D. C. Systems and Software Div.
COMPUTER SCIENCE AND TECHNOLOGY: A DATA BASE MANAGEMENT APPROACH TO PRIVACY ACT COMPLIANCE
Elizabeth Fong Jun. 1977 37 p refs
(PB-268500/6; NBS-SP-500-10; LC-77-608106) Avail: NTIS HC A03/MF A01 CSCL 09B

The Privacy Act provisions on personal record handling present new issues concerning effective use of commercial data base management systems (DBMS) by Federal agencies. A technical approach is proposed to compliance with certain Privacy Act requirements through the use of a generalized data base management system. Requirements are translated into a set of computer data files and procedures. These procedures, incorporated at pivotal points of data base software, can implement those Privacy Act compliance procedures amenable to automation. The use of DBMS appears to be a viable and technologically feasible solution to the effective and efficient implementation of many Privacy Act provisions.
GRA

N78-10724# Stanford Univ., Calif. Dept. of Computer Science.
EXPLANATION CAPABILITIES OF PRODUCTION-BASED CONSULTATION SYSTEMS
A. Carlisle Scott, William J. Clancey, Randall Davis, and Edward H. Shortliffe Feb. 1977 35 p refs
(Contract DAHC15-73-C-0435; ARPA Order 2494)
(AD-A042719; STAN-CS-77-593; HPP-77-1) Avail: NTIS HC A03/MF A01 CSCL 05/8

A computer program that models an expert in a given domain is more likely to be accepted by experts in that domain, and by non-experts seeking its advice, if the system can explain its actions. An explanation capability not only adds to the system's credibility, but also enables the non-expert user to learn from it. Furthermore, clear explanations allow an expert to check the system's 'reasoning', possibly discovering the need for refinements and additions to the system's knowledge base. In a developing system, an explanation capability can be used as a debugging aid to verify that additions to the system are working as they should. This paper discusses the general characteristics of explanation systems: what types of explanations they should be able to give, what types of knowledge will be needed in order to give these explanations, and how this knowledge might be organized. The explanation facility in MYCIN is discussed as an illustration of how the various problems might be approached.
Author (GRA)

N78-10726# Arizona Univ., Tucson. Dept. of Aerospace and Mechanical Engineering.
GEOMETRY AND FUNCTION DEFINITION FOR DISCRETE ANALYSIS AND ITS RELATIONSHIP TO THE DESIGN DATA BASE
H. A. Kamel and M. W. McCabe 1 Aug. 1977 33 p refs Presented at the First Intern. Symp. on Computer-Aided Hull-Surface Definition, Annapolis, 26-27 Sep. 1977; hosted by the Soc. of Naval Architects and Marine Engrs.
(Contracts N00014-75-C-0837; DOT-CG-43565-A; NR Proj. 064-531)
(AD-A043385; TR-2) Avail: NTIS HC A03/MF A01 CSCL 09/2

The purpose of this paper is to discuss data requirements for structural analysis, in order to clarify its dependence on the design process as a whole. The model generation capabilities of a state-of-the-art structural analysis system (GIFTS 4), heavily oriented towards pre-and post-processing and computer graphics, is presented. The system is capable of generating points, curves, surfaces, and solids in a hierarchical manner. It recognizes that geometric definition is only a part, albeit a fundamental part, of the structural system definition. The geometric components are used as a reference geometry, upon which the user may define loading patterns, kinematic boundary conditions, material property variation and so on. It is in linking these items together with the geometry that a structural analysis becomes feasible. In presenting and discussing the data base requirements for a structural analysis in a consistent manner, the designer of a CAD system is presented with basic data requirements to be included in his data base design.
Author (GRA)

N78-10731# California Univ., Livermore. Lawrence Livermore Lab.
RESEARCH LEADING TO THE PRODUCTION AND EARLY USE OF NUMERIC DATA BANKS OF MATERIAL PROPERTIES AND SYSTEM ANALYSES Quarterly Progress Report, Jul. - Sep. 1976
T. M. Quick and E. A. Henry 21 Mar. 1977 27 p refs
(Contract W-7405-eng-48)
(UCRL-50038-76-3) Avail: NTIS HC A03/MF A01

Research leading to creation of a numerical data base of material properties is described. The following material properties data requests were sent to the National Bureau of Standards (NBS) for assignment to data evaluation centers: 16 properties of 16 fiber materials considered for composite flywheel rotors; 27 properties of 13 epoxy resin systems and 6 polyester resins considered as matrix materials for fiber composite flywheels; and 13 properties of 18 metals and metal alloys that can store hydrogen in the form of metallic hydrides. A prototype structure for the material properties data bases was completed and used to organize data on the properties of salts used in thermal storage systems. The bibliographic data base for flywheel energy storage, containing 385 citations from the world literature, is being readied for publication. Some funds were recieved for a computerized communications network which will eventually enable ERDA/STOR scientist throughout the country to exchange information within their research specialties.
ERA

N78-11728# Naval Postgraduate School, Monterey, Calif.
AN ADAPTATION OF THE HERSHEY DIGITIZED CHARACTER SET FOR USE IN COMPUTER GRAPHICS AND TYPESETTING M.S. Thesis
Patrick Michael Doyle Jun. 1977 171 p refs
(AD-A042291) Avail: NTIS HC A08/MF A01 CSCL 09/2

Font definitions of 1377 characters of various styles developed by Allen V. Hershey were used as an initial data base. His character definitions were first put into a form suitable for use by vector graphics display processors, and then these vectors were converted into dot matrix form in a variety of point sizes. This conversion and digitization process was done using the C programming language; the host computer was a PDP-11/50 with the UNIX operating system, and the computerized typesetting was done on a VERSATEC 1200-A printer/plotter. As a result, a large data base for use in computerized typesetting has been developed. In addition, the computerized typesetting system at the Naval Postgraduate School has been improved and adapted to make use of the large number of fonts now available.
Author (GRA)

N78-12876 George Washington Univ., Washington, D. C.
A COMPARATIVE STUDY OF VERY LARGE DATA BASES Ph.D. Thesis
Edward Hill Jr 1977 230 p
Avail: Univ. Microfilms Order No. 77-17210

A comparison of methods is provided for organizing very large amounts of stored data called a very large data base to facilitate fast retrieval of desired information on direct access storage devices. The average number of accesses to store and retrieve items on a direct access storage device for hashing methods using chaining with separate lists and linear probing is presented. A new algorithm and performance measures for chaining with coalescing lists are presented. New performance measures are presented for storing and retrieving with a binary search tree and a tree stored on a direct access storage device. Algorithms are presented to perform retrieval, insertion, deletion and the inverted file generation operations for an inverted file. New performance measures are presented for an inverted file. The methods are developed using a component concept. A hybrid method involving components is used for the linked files.
Dissert. Abstr.

N78-12992# Computer Corp. of America, Cambridge, Mass.
A DISTRIBUTED DATABASE MANAGEMENT SYSTEM FOR COMMAND AND CONTROL APPLICATIONS Semiannual Technical Report, 1 Jan. - 30 Jun. 1977
30 Jun. 1977 125 p refs
(Contract N00039-77-C-0074)
(AD-A044441; CA-78-06; SATR-1) Avail: NTIS HC A06/MF A01 CSCL 09/4

This report summarizes the first six months of a project entitled, A Distributed Database Management System for Command and Control Applications. The key objective of this effort is to design and implement a distributed database management system called SDD-1 (System for Distributed Databases). SDD-1 will be installed in phases and tested. GRA

N78-12998# Mitre Corp., Bedford, Mass.
GEOGRAPHIC DATA DISPLAY IMPLEMENTATION
D. H. Lehman Jun. 1977 228 p refs
(Contract F19628-77-C-0001)
(AD-A044821; MTR-3349; ESD-TR-77-137) Avail: NTIS HC A11/MF A01 CSCL 09/2

To support automated display of positional intelligence data, detailed geographic background displays are needed over a wide range of scales. The Geographic Data Display System (GDDS) displays geographic data on a raster scan display and allows the user to zoom and translate around a map of Central Europe. As the user zooms in on an area, the area is displayed in greater detail, and geographic features such as rivers, roads, etc., are added to the display. This report outlines the capabilities and design of the GDDS, describes the implementation, and documents the programs. Author (GRA)

N78-13753# Sharp (I.P.) Associates Ltd., Ottawa (Ontario).
ON SPECIFYING THE FUNCTIONAL DESIGN FOR A PROTECTED DMS TOOL
Gillian Kirkby and Michael Grohn Mar. 1977 295 p refs
(Contract F19628-76-C-0025; AF Proj. 2801)
(AD-A045537; ESD-TR-77-140) Avail: NTIS HC A13/MF A01 CSCL 05/2

A top level functional design for a secure relational data base system is described, which addresses the multi-level data sharing problem. The system consists essentially of isolated user working areas, hidden security kernel mechanisms, and a multi-level data base. Mathematical (Parnas) specifications are included for all primitive functions of the secure DMS. Author (GRA)

N78-13754# Michigan Univ., Ann Arbor. Systems Engineering Lab.
A METHODOLOGY FOR DATA BASE DESIGN IN A PAGING ENVIRONMENT Interim Report, 1 Oct. 1976 - 1 May 1977
Elias Baralian and Keki B. Irani Sep. 1977 302 p refs
(Contract F30602-76-C-0029; AF Proj. 5581)
(AD-A045544; RADC-TR-77-282) Avail: NTIS HC A14/MF A01 CSCL 05/2

Report is concerned with the development of a methodology for partially automating the design of the logical structure of a paged data base. The approach is to map a high-level description of user requirements in terms of individual data items and binary relations into a set of record structures and record relationships. Subject to storage and security constraints, the goal is to produce a minimum number of page faults for a pre-specified set of user activities. Author (GRA)

N78-13756# Computer Corp. of America, Cambridge, Mass.
VERY LARGE DATABASES Final Technical Report, 1 Jul. 1976 - 30 Jun. 1977
Robert H. Dorin and Joanne Z. Sattley 30 Aug. 1977 98 p refs
(Contract N00014-76-C-0991)
(AD-A045823; CCA-77-10) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report summarizes work performed under the ARPA Very Large Databases program. Section 1 describes the Datacomputer Technology Transfer project (DTT). This project was aimed at expansion of the Datacomputer user community by increasing the awareness of this unique tool in the government community. The result of this project was a substantial increase in Datacomputer utilization. Section 2 describes the Message Archiving and Retrieval System (MARS) project. The MARS effort was directed toward the design and implementation of a prototype system to provide economical storage and convenient retrieval of Arpanet mail. The system has been fully implemented and is operational at CCA on an experimental basis. This report describes the MARS prototype as well as concepts for future extensions of the system. GRA

N78-13757# Sanders Associates, Inc., Nashua, N. H.
SENSOR DATA CORRELATION SYSTEM DEVELOPMENT, VOLUME 1 Final Technical Report, 9 Jun. 1975 - 8 Feb. 1976
James L. Burrows and Wilfred E. Reynolds Griffiss AFB, N. Y. RADC Jul. 1977 143 p refs
(Contract F30602-75-C-0304)
(AD-A045541; SAN-GA-76-087-2-Vol-1; RADC-TR-76-243-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 09/2

This report describes components of an associative/parallel processor system configured to provide rapid correlation of input data at a four megabyte-per-second data rate. The system permits correlation criteria to be entered via CRT terminal, and displays retrieved records or summaries on the same terminal. Author (GRA)

N78-14786 Michigan Univ., Ann Arbor.
A METHODOLOGY FOR DATA BASE DESIGN IN A PAGING ENVIRONMENT Ph.D. Thesis
Elias Baralian 1977 297 p
Avail: Univ. Microfilms Order No. 77-17950

A methodology for partially automating the design of the logical structure of a paged data base is described. The approach is to map a high level description of user requirements in terms of individual data items and binary relations into a set of record structures and record relationships. Intra- and inter-record structures generated by this design method conform to the CODASYL Data Base Task Group specifications. The data base is assumed to be accessed in a paging environment. The mapping is such that the resulting data base structure is optimal, over a certain class of DBTG structures, in the sense that it produces a minimum expected number of page faults for a prespecified set of user activities, subject to storage and security constraints. An example application was constructed and the results of applying the data base design methodology to the example application have been studied. Dissert. Abstr.

N78-14787 Cornell Univ., Ithaca, N. Y.
DESIGN OF A USER INTERFACE FOR A RELATIONAL DATA BASE Ph.D. Thesis
Eric Krumholz Clemons 1976 225 p
Avail: Univ. Microfilms Order No. 77-18864

An interface is proposed between user data processing programs (UDPP) and a relational data base management system (RDBMS). A user schema facility for a relational data base was developed. Its principal advantage over more conventional data base systems was its structural simplicity, permitting mathematical definition of all retrieval operators, rigorous development of update properties and the greatest possible generality of supported queries. However, the simplicity of supported structures was also the major limitation of the relational model: a single hierarchically structured record from a COBOL-type file may correspond to numerous tuples stored in several normal form relations. Reconstruction of the original record was the user's responsibility: the required tuples must be identified for retrieval on the basis of content, and their data combined and reformatted as necessary. Dissert. Abstr.

N78-15709# Harry Diamond Labs., Adelphi, Md.
IMPLEMENTATION OF THE DEVICE DATA BANK ON THE HDL IBM COMPUTER
Thomas V. Noon Oct. 1977 94 p refs
(AD-A048480; HDL-TR-1819) Avail: NTIS HC A05/MF A01
CSCL 09/5

The Device Data Bank, as used by the DAMTRAC and, in the near future, the NET2 circuit-analysis programs on the Harry Diamond Laboratories' IBM 370/168 computer, is presented. The new file structure of the device libraries, access method for use of the device parameters by DAMTRAC and other computer programs, and a management program to manage and maintain the device data bank are presented in detail. The job control language (JCL) for executing the IBM version of DAMTRAC on the HDL computer is also presented. Author (GRA)

N78-15710# University of Southern Calif., Los Angeles. Image Processing Inst.
IMAGE UNDERSTANDING RESEARCH Semiannual Technical Report, 1 Apr. - 30 Sep. 1977
30 Sep. 1977 218 p refs
(Contract F33615-76-C-1203; ARPA Order 3119)
(AD-A048214; USCIPI-770) Avail: NTIS HC A10/MF A01
CSCL 09/2

This technical report summarizes the image understanding, smart sensor, and image processing research activities performed by the Image Processing Institute at the University of Southern California during the period of 1 April 1977 through 30 September 1977 under Contract Number F-33615-76-C-1203 with the Advanced Research Projects Agency Information Processing Techniques Office. The research program has as its primary purpose, the development of techniques and systems for understanding images. Five tasks are reported: Image Understanding Projects, Image Processing Projects, Smart Sensor Projects, Recent Ph.D. Dissertations, and Recent Institute Personnel Publications. The image understanding tasks reported on include comparison of region growing versus boundary delineated segmentation, analytic results on the clustering segmentor, development of feature extractors for edge detection, circle detection, line detection, and texture detection and higher level image understanding for an interactive user system as well as a system for sharing information between existing image understanding programs. GRA

N78-16045# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
AN APPROACH TO DEDUCTIVE QUESTION-ANSWERING
Raymond Reiter Sep. 1977 169 p refs
(Contract N00014-77-C-0378; ARPA Order 3414)
(AD-A046550; BBN-3649) Avail: NTIS HC A08/MF A01
CSCL 09/2

This paper is concerned with a variety of issues which arise in deductive question-answering. Its principal concern is with the design of a retrieval system which combines current techniques for query evaluation on relational data bases with a deductive component in such a way that the interface between the two is both clean and natural. More specifically, a suitably designed theorem prover sweeps through the intensional data base (i.e., the set of general facts about the domain of interest), extracting all information relevant to a given query. The end result of this sweep is a set of queries, each of which is then evaluated over the extensional data base (i.e., the set of specific facts). The union of the answers returned from each of these queries is the set of answers to the original query. This paper also addresses some issues on how best to structure a data base. Part of this paper is concerned with issues of integrity. Finally, an approach for compiling the intensional data base is proposed. GRA

N78-16046# RAND Corp., Santa Monica, Calif.
RITA REFERENCE MANUAL Interim Report
R. H. Anderson, Margaret Gallegos, J. J. Gillogly, R. [illegible], and R. Villanueva Sep. 1977 82 p
(Contract DAHC15-73-C-0181; ARPA Order 189)
(AD-A046627; R-1808-ARPA) Avail: NTIS HC A05/MF A01
CSCL 09/2

A detailed reference manual for the RITA system, a set of computer programs which enable a user to develop user agents to perform such tasks as providing a simple interface to remote data systems. The system makes available a language for writing rules describing those agents, behavior and an operating environment in which the rules are interpreted. It also provides some heuristic modeling capability. The report describes the RITA concepts, keywords, and commands. A complete syntax chart for the system, with tables of reserved words and built-in functions, is also included, along with an illustrative example of a RITA rule set. GRA

N78-16086# California Univ., Livermore. Lawrence Livermore Lab.
COMPARISON OF THE EXTENDED SET THEORY AND RELATIONAL APPROACHES TO DATA BASE MANAGEMENT
Edward W. Birss and Jeffry W. Yeh 12 Apr. 1977 21 p refs
Presented at 3rd Intern. Conf. on Very Large Data Bases, Tokyo, 6-8 Oct. 1977
(Contract W-7405-eng-48)
(UCRL-79357; Conf-771007-1) Avail: NTIS HC A02/MF A01

The extended set model is compared with the relational model; the extended set model is found to be more general than the relational model, primarily because of the recursive definition of a set in extended set theory. This definition, and its ramifications, permit some interesting capabilities including data compaction, dynamic restructuring, and physically maintaining multiple updatable views of data. ERA

N78-16087# Sandia Labs., Albuquerque, N. Mex.
BARRIER DATA BASE USERS GUIDE
R. B. Worrell, D. J. Gould, and D. W. Wall Jun. 1977 50 p refs
(Contract EY-76-C-04-0789)
(SAND-76-0521) Avail: NTIS HC A03/MF A01

A special purpose data base for physical security barriers has been developed. In addition to barriers, the entities accommodated by the barrier data base include threats and references. A threat is established as a configuration of people and equipment which has been employed to penetrate a barrier. References are used to cite publications pertinent to the barriers and threats in the data base. Utilization and maintenance of the barrier data base is achieved with LIST, QUERY, ENTER, DELETE, and CHANGE commands which are used to manipulate the data base entities. ERA

N78-16088# National Bureau of Standards, Washington, D. C. Technology Div.
COPYRIGHT IN COMPUTER-READABLE WORKS: POLICY IMPACTS OF TECHNOLOGICAL CHANGE Final Report
Roy G. Saltman Oct. 1977 271 p refs
(Grant NSF SIS-74-14168)
(PB-272789/9; NBS-SP-500-17; LC-77-14143) Avail: NTIS HC A12/MF A01 CSCL 09B

The findings, recommendations, and conclusions of a policy-oriented, multi-disciplinary study of copyright in computer-readable works are reported. The foundations of copyright are examined for basic principles, and the theory of public goods is applied to develop the rationale for copyright protection. The judicial history of copyright in the twentieth century is reviewed with respect to advances in information technology. The impact of technological change on judicial decision-making in copyright is analyzed. The problem of transaction costs for copyrighted works is examined, and models of policymaking are developed. GRA

N78-17090# Science Applications, Inc., Arlington, Va.
EXPLORATORY EXAMINATION OF PURGE TECHNIQUES Final Report, 15 Sep. 1976 - 15 Jul. 1977
John J. Seelberg, James R. Miller, Terry L. Fraser, and Carol A. Kagan Nov. 1977 155 p refs
(Contract DAHC19-76-C-0050)

(AD-A047384; SAI-78-614-WA; ARI-TR-77-A21) Avail: NTIS
HC A08/MF A01 CSCL 15/7

The problem of overload in tactical information systems can be reduced by purging—freeing a tactical data base of useless, redundant, outdated, and incorrect information. Technological changes in ground combat and in information acquisition and handling have created the requirement for an automated Tactical Operations System (TOS) for command and control, and established a need for purging. This report analyzes the role of information in decisionmaking and examines techniques for identifying a decisionmaker's information needs. Current purging procedures and division level informational needs for land combat are reviewed and potential criteria developed for identifying information essential for task performance in the Division Tactical Operations Center. Rules, techniques and operative procedures are suggested which can be employed to manage and control TOS data. Purging procedures employed with manual files or written records are not directly adaptable to automated systems, although such procedures provide precedents which can aid in establishing suitable methods for purging automated systems. The computer industry has not focused upon purging as a problem. However, a number of available computer science techniques can help meet purging needs. A number of existing quantitative methods can be used to evaluate purge technology innovations. New innovative methods are required for managing combat information in automated systems at Army Division level to prevent overload and to improve control and direction of engaged forces. Author (GRA)

N78-17782# Maryland Univ., College Park. Dept. of Information Systems Management.

PROBLEMS IN THE TRANSLATION AND STANDARDIZATION OF RELATIONAL AND NETWORK TYPE DATA BASE MANAGEMENT SYSTEMS Final Report, 30 Jun. 1976 - 29 Jun. 1977

Edgar H. Sibley 14 Sep. 1977 4 p
(Grant DAAG29-76-G-0300)
(AD-A047733; ARO-14322.1-A-EL) Avail: NTIS
HC A02/MF A01 CSCL 09/2

Database Management Systems (DBMS) are now well established as a tool for information system implementation. However, the debates over relational and network systems have underlined the need to provide new systems with both capabilities as well as to understand the theoretical aspects which will make standardization possible. The reported research is intended to foster such an approach. GRA

N78-17783# Maryland Univ., College Park. Dept. of Information Systems Management.

THE DEVELOPMENT OF A PERFORMANCE EVALUATION MODEL FOR DBMS NETWORK STRUCTURES Final Report, 25 May 1976 - 24 May 1977

Edgar H. Sibley and Allen Reiter (Technion - Israel Inst. of Technol.) 12 Aug. 1977 4 p refs
(Grant DAAG29-76-G-0247)
(AD-A047734; ARO-14250.1-A-EL) Avail: NTIS
HC A02/MF A01 CSCL 09/2

The field of database management systems (DBMS) is one of the most rapidly expanding areas in automated information technology today. One of the major problems faced by the users of DBMS is the decision on what types of problems best suit what classes of systems, and what improvements (or minor reprogramming) could really pay off in terms of better performance for small capital outlay. This proposal seeks to model one particular class of DBMS: the network structured system; this model will aid the user in tuning the overall systems for better performance, and help the designer of the information systems in making better logical design decisions. Author (GRA)

N78-18782# Massachusetts Inst. of Tech., Cambridge. Center for Information Systems Research.

AN EXERCISE IN SOFTWARE ARCHITECTURAL DESIGN: FROM REQUIREMENTS TO DESIGN PROBLEM STRUCTURE

Rafael C. Andreu and Stuart E. Madnick Nov. 1977 129 p refs
(Contract N00039-77-C-0255)
(AD-A048785; CISR-P010-01-06; CSIR-TR-3) Avail: NTIS
HC A07/MF A01 CSCL 09/2

Two of the main activities required for the application of the methodology explored in this project, namely, the assessment of design interdependencies among requirements and the interpretation of subsets of requirements as design subproblems, are investigated in the context of a concrete design problem. Guidelines for carrying out these activities are introduced and their usage illustrated. A design framework for the problem analyzed is identified and discussed; its study points out that the methodology investigated here produces interesting and unforeseen results. Author (GRA)

N78-18830 Ohio State Univ., Columbus.

DESIGN OF EVENT-DRIVEN PROTECTION MECHANISMS Ph.D. Thesis

David Cohen 1977 312 p
Avail: Univ. Microfilms Order No. 77-31848

An attempt was made to include protection mechanisms in which access decisions depend upon additional factors such as user's access history and system's data. The protection mechanism includes three major processes, the authorization process, the monitoring process, and the enforcement process. A detailed analysis of the system was provided, including major design tradeoffs with respect to storage and processing requirements. The protection mechanism can adjust the level of data sharing supported according to the operating system resources available. The effect of multiprocessing, reliability and distribution of the data base system on query processing was examined. Dissert. Abstr.

N78-20770 Syracuse Univ., N. Y.

A MULTIPLE ASSOCIATIVE-MEMORY SYSTEM FOR PIPELINING A DIRECTORY TO A VERY LARGE DATA BASE Ph.D. Thesis

Ashok Kumar Singhania 1977 186 p
Avail: Univ. Microfilms Order No. 77-30789

To satisfy the requirements of real time multiple attribute retrievals, utilization of a directory to the data base was assumed. A structure was then proposed for a directory that minimizes accesses to the data base in addition to allowing complex multiple key interrogations and being amenable to associative searching. The storage requirements for the proposed directory, which is hierarchical in nature, is shown to be quite modest, requiring a small fraction of the total data base storage space. Also proposed is a system architecture for a device utilizing a series of associative memory arrays that can be used to efficiently search the directory. The proposed architecture capitalizes on the time-disjoint hierarchy of operations involved in searching a multilevel directory by pipelining the search operations at the various levels and thus providing concurrency. Dissert. Abstr.

N78-20788# Naval Intelligence Processing System Support Activity, Alexandria, Va. Systems Management Div.

INTEGRATED DATA BASE DEVELOPMENT AND DESIGN GUIDE, VERSION 1.1

L. E. Towner Dec. 1977 247 p
(AD-A050488) Avail: NTIS HC A11/MF A01 CSCL 09/2

The development of an integrated data base is an expensive and highly detailed project. The speed with which applications can be added or enhanced is directly proportional to the analysis resources available. The most time-consuming part of the analysis is the definition of the data elements and their relationships. Once this is done the remainder of the design effort falls rapidly into place. The Guide provides a step-by-step set of instructions which lead to a subsystem specification of the user's desired application. At the same time it will permit the user, who knows more about the data than anyone else, to perform the initial phases of the analysis. GRA

N78-22740 Purdue Univ., Lafayette, Ind.
INFERENCE FROM STATISTICAL DATA BASES Ph.D. Thesis
Mayer Dlugach Schwartz 1977 104 p
Avail: Univ. Microfilms Order No. 78-03280

The inference problem is the most difficult in a three level hierarchy of security problems. A simple abstract model of a data base is defined in which query functions operate on confidential data items. Compromise means inference of unknown confidential items. The objective was to prove whether or not particular data base types are secure, and if they are not, how much work is required to compromise them. Dissert. Abstr.

N78-22743 Ohio State Univ., Columbus.
THE DESIGN AND PERFORMANCE OF A DATABASE COMPUTER Ph.D. Thesis
Krishnamurthi Kannan 1977 308 p
Avail: Univ. Microfilms Order No. 7806863

A data model which can support existing high level data models and which can be implemented directly in hardware was proposed. The model includes a powerful query language, a flexible security policy specification and enforcement mechanism, and a data clustering mechanism for performance enhancement. The detailed design of a data base computer (DBC) which supports the data model was carried out using emerging and current technologies. The DBC was organized into two pipelines of specialized processors and memory systems. These two pipelines are known as the structure loop and the data loop. The two loops were designed to operate in a highly concurrent fashion.
Dissert. Abstr.

N78-22748 Utah Univ., Salt Lake City.
AN APPLICATION OF DYNAMIC ADDRESS COMPUTATION IN DATA MANAGEMENT Ph.D. Thesis
Thomas James Cook 1977 257 p
Avail: Univ. Microfilms Order No. 7806789

An implementation technique called data-based computing which allows one to store and access data without the use of machine addresses was examined. The fundamental aspect of data-based computing is the use of data descriptions to dynamically derive address information for a given datum. The use of the data based implementation technique in the storing and access of data, in data manipulation and management functions (such as directories over collections of information), and in the organization of high-level data models (such as data base specifications and programming languages) was examined. The anticipated advantages of the data-based methods include a high degree of data independence, small space requirements, and suitability to a wide variety of data organization applications.
Dissert. Abstr.

N78-22752# Harry Diamond Labs., Adelphi, Md.
EXTENDING AND INTERFACING THE MDEP SEMICONDUCTOR DAMAGE DATA BANK FOR ANALYSIS AND RETRIEVAL BY DAMTRAC
Charles P. Rusin Dec. 1977 101 p refs
(AD-A050846; HDL-TR-1821) Avail: NTIS HC A06/MF A01 CSCL 09/2

Presented are four groups of programs to update, maintain, and list the diode and transistor data bases for use with circuit analysis codes. The data bases are specifically designed to work with the DAMTRAC code, but can work with other circuit analysis codes, too. Included in the data bases are the standard TRAC parameters, references to the sources of these parameters, and damage parameters with individual source references.
Author (GRA)

N78-22753# Logicon, Inc., San Diego, Calif.
TERMINAL ACCESS SYSTEM (TAS). SYSTEM DESIGN SPECIFICATION Final Report, 1 Nov. 1977 - 30 Jan. 1978
R. M. Barnhart, L. R. Erickson, M. E. Solegiad, and S. L. Westermark 30 Jan. 1978 662 p
(Contract N00014-76-C-0899)
(AD-A050867; Rept-76-C-0899-8) Avail: NTIS HC A99/MF A01 CSCL 09/2

The Terminal Access System (TAS) provides a uniform environment for computer naive intelligence analysts as they query data bases distributed on an ARPA-like network. TAS resides on a PDP-11/70 processor and operates under the UNIX Operating System. TAS performs as a user host on the network. TAS is composed of a large set of application processes which directly satisfy user entered commands involving text file editing, system status reports, and display of query responses. In addition to the TAS application processes, there is a set of system processes which provide fundamental interfaces for networking, access authorization, and network logging. These processes are designed such that other subsystems destined for TAS occupancy can utilize their facilities. The ARPA Data Access and Presentation Terminal (ADAPT) system is one such system. Key TAS system processes are the Batch Query and Response Dispatcher (BQRD) which provides internal management for all batch queries, the Intelligence Network Interface (INI) process, which emulates the COINS I protocol for TAS, the Interactive Query Interface (IQI) process, which provides system interfaces for interactive network transactions, the Access Authorization Process (AAP) which provides complete control of user/terminal access to the hosts and files residing on the COINS II network, and the TAS Logging Process (TLP) conglomerate which provides interfaces for network logging, both batch and interactive, and access authorization violations.
GRA

N78-22754# Massachusetts Inst. of Tech., Cambridge. Electronic Systems Lab.
GENERALIZATION OF HUFFMAN CODING TO MINIMIZE THE PROBABILITY OF BUFFER OVERFLOW
Pierre A. Humblet Feb. 1978 12 p refs Presented at the 1977 Intern. Symp. on Inform. Theory, Ithaca, N. Y.
(Contract N00014-75-C-1183)
(AD-A050874; ESL-P-800) Avail: NTIS HC A02/MF A01 CSCL 09/2

An algorithm is given to find a prefix condition code that minimizes the value of the moment generating function of its codeword length distribution for a given positive argument. This algorithm is used in an iterative way to yield a code that maximizes the rate of decay of the probability of buffer length increases.
Author (GRA)

N78-22755# Logicon, Inc., San Diego, Calif.
ADAPT 1 FINAL FUNCTIONAL AND SYSTEM DESIGN SPECIFICATION Final Report, 1 Nov. 1977 - 30 Jan. 1978
L. R. Erickson, M. E. Solegiad, and S. L. Westermark 30 Jan. 1978 428 p
(Contract N00014-76-C-0899)
(AD-A050866; Rept-76-C-0899-2-F) Avail: NTIS HC A19/MF A01 CSCL 09/2

Under the ADAPT project, a prototype intelligent terminal will be developed which provides users and/or other systems a uniform interface for accessing multiple online databases located on different systems. The underlying technology applied by ADAPT will be the transformation from one uniform data language, UDL, to other target query languages which reside on a network. The four database systems/query languages that will be transformed are the SIGINT On-Line Information System (SOLIS), Defense Intelligence Agency On-Line System (DIAOLS)/Intelligence Support System (ISS), Data Base Management System 1100 (DMS-1100)/Query Language Processor (QLP), and Technical Information Processing Systems (TIPS)/TIPS Interrogation Language (TILE). The ADAPT system is comprised of 23 distinct UNIX processes.
GRA

N78-22756# California Univ., Berkeley. Electronics Research Lab.
RESEARCH ON SOME PROBLEMS IN INFORMATION PROCESSING Final Report, 16 Dec. 1973 - 30 Jun. 1977

Eugene Wong 30 Jun. 1977 4 p
(Grant DAAG29-74-G-0067)
(AD-A051969; ARO-11895.12-EL) Avail: NTIS
HC A02/MF A01 CSCL 09/4

The research in this grant was conducted in two principal areas: Stochastic models for image processing; and Management of information and databases. Significant progress was achieved in both areas, and a concise description is included.

Author (GRA)

N78-23758# Army Armament Research and Development Command, Dover, N. J. Management Information Systems Directorate.

DASF: DESIGN OF ARTWORK FOR STANDARD FORMS Final Report

Joseph J. Sierodzinski Oct. 1977 159 p
(AD-A051426; MISD-UM-77-5) Avail: NTIS
HC A08/MF A01 CSCL 09/2

ARRADCOM has developed an interactive computerized system called Design of Artwork for Standard Forms (DASF). It was written to standardize forms design by using today's state-of-the-art graphics technology and equipment. With TEKTRONIX 4014 graphics storage tubes, Control Data series 6000 computers and a CALCOMP model 745 precision flatbed plotter, ARRADCOM is able to create, modify and store from artwork masters in their associated data bases in conversational sessions at a computer terminal. Artwork masters can be produced for local and higher authority Source Data Automation (SDA) systems with ink on paper, ink on mylar or exposed photographic film. These masters may then be used for mass reproduction of the forms. The reproduced forms may be utilized with REDACTOR's (TM), MTST's (TM), standard typewriter stations, and OCR equipment.

Author (GRA)

N78-23759# Naval Ocean Systems Center, San Diego, Calif.

MODELS OF OPTIMAL FILE ALLOCATION IN A DISTRIBUTED DATA BASE: A SURVEY. CLASSIFIES DISTRIBUTED FILE ALLOCATION MODELS AND DESCRIBES THE PARAMETERS NEEDED IN MODELING

T. H. Crocker and D. M. Klamer 15 Jan. 1978 30 p refs
(AD-A051142; NOSC/TR-195) Avail: NTIS HC A03/MF A01
CSCL 09/2

This report examines the existing distributed data base file allocation models and gives a breakdown of the models by type (deterministic one-phase, deterministic multi-phase, stochastic discrete, stochastic continuous). The relationships and identities used to describe the models are divided into four categories: file information and parameters, transmission characteristics, computer characteristics, and costs. In the investigations which led to this paper it was seen that the models defined were initially very general. The models included relationships which were very detailed in their description of the file allocation problem. In previous analyses using these models, simplifications were often made for computational tractability. Many of the assumptions and models ended up so restricted in scope or detail as to be unrealistic. There is a great need for more work in this area.

Author (GRA)

N78-23762# California Univ., Livermore. Lawrence Livermore Lab. Data Management Research Group.

GENERAL FEATURES OF A SCIENTIFIC DATA BASE MANAGEMENT SYSTEM

Viktor E. Hampel and Daniel R. Ries 1977 28 p refs Presented at OECD/NEA Working Group on Nucl. Inform. Berkeley, Calif., 5-7 Oct. 1977 Submitted for publication
(Contract W-7405-eng-48)
(UCRL-80/171; Conf-771062-4) Avail: NTIS
HC A03/MF A01

Probable causes for the absence of a generalized data base management system as a portable program are discussed as well as some of the following: (1) the difficulty to recognize the value of accurate and up-to-date information and data as a national resource; (2) the gradual evolution of high efficiency specialized installation dependent programs where large volumes of data are present; (3) the historical trend to judge the power of a computer by its calculational speed alone; and (4) the consequent delegation of data management to a piggy-back parasitic role on the large machine. In view of these considerations and on the basis of experience with a diversity of simple and complex information and data, some of the necessary and desirable features for a general scientific data base management system were established.

ERA

N78-25782# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.

ATTRIBUTE PARTITIONING IN A SELF-ADAPTIVE RELATIONAL DATABASE SYSTEM M.S. Thesis

Bahram Niamir Jan. 1978 180 p refs Sponsored by ARPA
(Contracts N00014-75-C-0661; N00014-76-C-0944)
(AD-A053292; MIT/LCS/TR-192) Avail: NTIS
HC A09/MF A01 CSCL 05/2

One technique that is sometimes employed to enhance the performance of a database management system is known as attribute partitioning. This is the process of dividing the attributes of a file into subfiles that are stored separately. By storing together those attributes that are frequently requested together by transactions, and by separating those that are not, attribute partitioning can reduce the number of pages that must be transferred from secondary storage to primary memory in order to process a transaction. The goal of this work is to design mechanisms that can automatically select a near-optimal attribute partition of a file's attributes, based on the usage pattern of the file and on the characteristics of the data in the file. The approach taken to this problem is based on the use of a file design cost estimator and of heuristics to guide a search through the large space of possible partitions. The heuristics propose a small set of promising partitions to submit for detailed analysis. The estimator assigns a figure of merit to any proposed partition that reflects the cost that would be incurred in processing the transactions in the usage pattern if the file were partitioned in the proposed way. We have also conducted an extensive series of experiments with a variety of design heuristics; as a result, we have identified a heuristic that nearly always finds the optimal partition of a file.

GRA

N78-26747 Kansas Univ., Lawrence.

TOWARDS THE DESIGN AND IMPLEMENTATION OF A UNIFIED DATA BASE MANAGEMENT SYSTEM Ph.D. Thesis

James Robert Driscoll 1977 157 p
Avail: Univ. Microfilms Order No. 7809346

The problem of developing a data base management system (DBMS) which can support different user views is addressed. The need to support at least the network, hierarchical and relational models and languages is met by introducing model definition primitives (MDP), model navigation primitives (MNP) and sufficient system structure to enable specification of user data definition language (DDL) and data manipulation language (DML) to define the various views. The MDP and MNP are defined with respect to a precise concept of a link based on the connection properties of data value occurrences. A precise definition of the link concept, which has not been carefully formulated in the literature, is critical to the development of a unified DBMS. Specific hierarchical, network and relational examples are included to demonstrate that their DDL and DML can indeed be defined in terms of the MDP and MNP.

Dissert. Abstr.

N78-27782 Pittsburgh Univ., Pa.

FACTORS IN THE DESIGN OF FILE AND DATA BASE SYSTEMS Ph.D. Thesis

Carol Ann Sledge 1977 236 p
Avail: Univ. Microfilms Order No. 78-09557

The measure of performance is the time required to process a query to the system. Two types of data base systems were studied, a system with an inverted structure and one with a network structure. A simulation model of these systems are constructed and implemented using SIMULA 67. While the model has a number of parameters, this study focused on six: (1) the length of the list of data records associated with a particular access key name and values, (2) the number of these lists associated with the minimal set of access key names and values which describe a particular query to the system, (3) the percentage of the data records on the lists of 2 which satisfy the conditions of the query, (4) the locality of reference for the data records which are retrieved, (5) the size of a data record, and (6) the total number of data records in the system. A rather exhaustive collection of the factors which can affect the performance of a file or data base system is presented. Dissert. Abstr.

N78-27786# Battelle Pacific Northwest Labs., Richland, Wash.

CALCULATION OF POPULATION DISTRIBUTION USING A COMPUTER DATA BASE

E. R. Hill Aug. 1977 10 p refs
(Contract EY-76-C-06-1830)
(BNWL-2395) Avail: NTIS HC A02/MF A01

The program and data base were developed primarily for marketing purposes. The EPA subsequently adapted them for use in population exposure problems. The program was used to study populations in the neighborhood of reactors. The output was aggregated for each reactor location and then introduced to other computer programs for additional calculations. In this study, the distributions were obtained for 10 concentric annuli within 80 km of the reactor sites. The annuli were divided into sixteen sectors centered on points of the compass. The population data base is an edited and compressed version of the 1970 U.S. Census Bureau's Master Enumeration District List with Coordinates. It consists of approximately 250,000 records, each of which represents a census enumeration district (CED). Each record contains the geographic coordinates of the population centroid for the district, population and housing counts, state and county codes. ERA

N78-27788# Los Alamos Scientific Lab., N. Mex.

CAD-CAM INTERACTIVE GRAPHICS SYSTEM DESIGNED BY USERS

D. J. Lauer 1978 20 p Presented at the 15th Ann. Numerical Control Conf., Chicago, 9-12 Apr. 1978
(Contract W-7405-eng-36)
(LA-UR-78-179; Conf-780411-1) Avail: NTIS HC A02/MF A01

An interactive graphics system was specified and developed to integrate design, drafting, testing, analysis, and manufacturing operations to achieve efficient and effective laboratory-wide services. To accomplish this, the graphics system is hardware independent and has an associative data base structured on two- and three-dimensional, bounded geometry. The data base allows for levels of attributes that can be attached or deleted and interrogated. This graphics system is described with emphasis on its capability and efficiencies and the effect of the associative data base on the design--build--test cycle. The capability of attaching attributes is explored as the means of comminicating the design and manufacturing data base to the management data base. The graphic system is shown to be cost effective for the big as well as small user. ERA

N78-27791# Los Alamos Scientific Lab., N. Mex.

DATA-BASE MANAGEMENT SYSTEM FOR SPATIAL DISPLAY OF FEDERAL OFFSHORE OIL AND GAS LEASE DATA

J. L. Sibert, Richard Phillips, and John Lohrenz 1978 12 p refs Presented at the 2d Geol. Surv. Computer Symp., Reston, Va., 22 Mar. 1978
(Contract W-7405-eng-36)
(LA-UR-77-2779; Conf-780311-1) HC A02/MF A01

A data-base management system that meets requirements for color-coded map displays and is used for Federal offshore oil and gas lease data of the LPR-5 and LPR-10 data bases is described. The data base is accessed using a powerful and easily learned query language that resembles simple English. Data base searches may be keyed on either data items or functions of data items. For example, all leases that are produced at flush level can be located with one simple query. Provision is made for graphical output, including production of high-quality color maps. The data base has a network structure however, the user need not be aware of the structure to query the data base. Examples are provided of several different types of queries and the resulting output. ERA

N78-27792# National Bureau of Standards, Washington, D. C. Systems and Software Div.

COMPUTER SCIENCE AND TECHNOLOGY: DATABASE ADMINISTRATION: CONCEPTS, TOOLS, EXPERIENCES, AND PROBLEMS

Belkis Leong-Hong and Beatrice Marron Mar. 1978 52 p
(PB-278664/8; NBS-SP-500-28; LC-78-606197) Avail: NTIS HC A04/MF A01 CSCL 09B

The concepts of database administration, the role of the database administrator (DBA), and computer software tools useful in database administration are described in order to assist database technologists and managers. A study of DBA's in the Federal Government is detailed in terms of the functions they perform, the software tools they use, the problems they have encountered, and advice they offer. Finally, some guidelines are presented on what database administration should do for management, and what management must do for their DBA's. GRA

N78-28821# Logistics Management Inst., Washington, D. C.

USER'S GUIDE: DATA BASE MAINTENANCE SYSTEM OF THE PIES

M. Shaw, M. Fiorello, G. Starr, and J. Susick Oct. 1977 41 p
(Contract EM-77-C-01-8561)
(HCP/170070-01) Avail: NTIS HC A03/MF A01

The PIES data base management system (DBMS) is designed to control and document the PIES data and the PIES data changes. In addition, an on-retrieval capability is available to identify the current PIES data values. As an integral part of the DBMS, there is a PIES data base administrator (DBA), who is responsible for the integrity of the PIES data and the level and quality of its associated documentation. The DBA is also responsible for maintaining the DBMS itself and for providing assistance in its usage. The data query program provides on-line retrieval of the PIES data values and data descriptions. The PIES data tracking report program produces reports documenting the PIES data and changes made to the PIES data. User procedures and instructions for completing the DBMS forms are also discussed.

Author (ERA)

N78-28822# Logistics Management Inst., Washington, D. C.

ADMINISTRATOR'S GUIDE: DATA BASE MAINTENANCE SYSTEM OF THE PIES

M. Shaw Oct. 1977 37 p
(Contract EM-77-C-01-8561)
(HCP/170070-02) Avail: NTIS HC A03/MF A01

The guide for the administrator of the data base maintenance system (DBMS) is given. Instructions are provided on how to use the data tracking update program (TRAKUP) and the data dictionary load program (DDLOAD). TRAKUP is used to update the PIES data values and the PIES data documentation. DDLOAD is used to generate the data dictionary that contains descriptive names for rows and columns of PIES data tables; beside loading the data dictionary from a card-image file, the program can print a report of the data dictionary. Also discussed are DBA procedures, instructions for completing the PIES data change request load, DMBS TSO procedures and JCL, and the DBMS file security system. Author (ERA)

N78-28833# Joint Publications Research Service, Arlington, Va.

PROGRESS WITH AUTOMATED SYSTEMS REPORTED

D. G. Zhimerin *In its* Transl. on USSR Sci. and Technol. (JPRS-71512) 20 Jul. 1978 p 18-23 Transl. into ENGLISH from Ekon. Gazeta (USSR), no. 33, May 1978 p 7

Copyright. Avail: NTIS HC A06/MF A01

The application of computer technology and automated control systems in the Soviet economy is reviewed. The tasks required to increase their efficiency include the development of standard programs and standard designs for collective-use computing centers and control systems, and the production and distribution of improved third generation Ryad-type computers. A.R.H.

N78-29764 Alabama Univ., University.

INTERACTIVE COMPUTER METHODS FOR CALCULATING GEOMETRICAL AND INERTIAL PROPERTIES OF GENERAL SHAPED AREAS AND VOLUMES OF REVOLUTION Ph.D. Thesis

Donna Sanders Farrior 1977 287 p
Avail: Univ. Microfilms Order No. 7809854

Methods for representation of a plane boundary curve are developed. One method uses spline interpolation with an extension for sharply turning corners. The other method is developed from an exact representation of the boundary by straight line segments and circular arcs. Green's Theorem is used to transform the various area integrals representing the geometrical and inertial properties into line integrals. Integrals for straight line segments are evaluated exactly and those for circular arcs are obtained numerically by use of a composite Gauss integration rule. Two computer programs, INERTSPL and GAIP, implementing these ideas are given. Requirements are established for a versatile computer aided design system incorporating the above numerical techniques. Such a system, called GAIP2, featuring a large user data base, graphics displays, and a flexible command language is developed. Dissert. Abstr.

N78-29766 Utah Univ., Salt Lake City.

OBJECT MODELS FOR COMPUTER AIDED DESIGN Ph.D. Thesis

Russell Jay Athay 1978 253 p
Avail: Univ. Microfilms Order No. 7811013

An underlying modeling system to support applications in computer aided design and scientific modeling was developed. Particular emphasis was given to two key issues: (1) data base support and (2), graphic interaction. The modeling system which was designed and implemented partitions the data base into discrete objects. It is claimed that this partitioning of the model into objects provides not only efficiency, but also clarity and flexibility. A graphic support system for designing complex three dimensional objects was implemented in the context of object models. The ideas discussed were implemented as actual working systems. These systems were used as the basis for an extensive mine engineering application and some preliminary work in the modeling of complex protein molecules. Dissert. Abstr.

N78-29770 Illinois Univ. at Chicago Circle, Chicago.

OPTIMIZATION TECHNIQUES IN DESIGNING RELATIONAL DATABASE SYSTEMS Ph.D. Thesis

Wu-Haung Cheng 1978 224 p
Avail: Univ. Microfilms Order No. 7811085

An algebraic minimal cover algorithm is presented, which can be easily performed manually as well as automatically. Also, techniques for constructing a well formed integrated set of user views are presented, which is for designing an integrated database for all users. Techniques for constructing a decomposition tree are presented. And, a dynamic programming model is presented for finding a nearly optimal subset of a decomposition tree. Queued evaluation nets are presented, which are to hold incomplete updating commands from various users on shared information so that every user still sees what he should see or expect to see. Some miscellaneous aspects of logical database syntheses are also studied. They are: (1) weighting function. Dissert. Abstr.

N78-29773# Inco, Inc., McLean, Va.

TRANSPARENT INTEGRATED INTELLIGENCE NETWORK: RESPONSE NORMALIZATION Final Technical Report, 15 Dec. 1976 - 14 Dec. 1977

Paul Stygar Griffiss AFB, N.Y. RADC Apr. 1978 115 p refs
(Contract F30602-77-C-0030; AF Proj. 4594)
(AD-A054308; INCO/1088-1277-TR-55-D(F); RADC-TR-78-74) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report presents preliminary specifications for a subsystem to normalize the query report formats received from heterogeneous DBMS in a Transparent Integrated Intelligence Network (TIIN). Author (GRA)

N78-29775# Naval Research Lab., Washington, D. C. Communication Systems Div.

AN EXPERIMENT IN DATABASE ACCESS CONTROL Interim Report

Frank A. Manola and David K. Hsiao (Ohio State Univ.) 16 Mar. 1978 38 p refs Presented at 1st Intern. Conf. on Computer Software and Appl., Chicago, 8-11 Nov. 1977
(RF21211401)
(AD-A054189; NRL-8176) Avail: NTIS HC A03/MF A01 CSCL 09/2

To prevent unauthorized access to sensitive information, contemporary data-management systems may require redundant hardware, software, and data. In a military environment, where information is classified and users must have specific access clearances, the lack of automated enforcement of administrative control and the tendency toward overclassification can further increase hardware, software, and data requirements. A naval database was created for an experimental data-secure system to show that the system's advanced features can help solve real-world access-control problems and eliminate related hardware, software and data redundancy. Typical scenarios which characterize multilevel access-control requirements in a real military environment were devised and tested on the system. The experience from demonstration of the system relates to the general area of access control in database-management systems. Author (GRA)

N78-29778# Los Alamos Scientific Lab., N. Mex.

COMPUTER ASSISTED COST ESTIMATING AT LOS ALAMOS SCIENTIFIC LABORATORY

James E. Spooner and Roger A. Stutz 1977 10 p ref Presented at the AESOP ERDA Contractor Symp. on Computers, Boston, 14 Sep. 1977
(Contract W-7405-eng-36)
(LA-UR-77-2070; Conf-770937-2) Avail: NTIS HC A02/MF A01

Compared to a manual system, an improvement in production time of the original estimate and a significant improvement in response time to subsequent alternates was expected. In addition, the impact of design and scope changes throughout the life of the project will be recorded against a detailed, rather than gross model of the project. LACCE is a 33,000 line FORTRAN code and operates interactively on our CDC 6600 under NOS and incorporates two on-line data bases for system assemblies, as well as construction tasks. Off-line data bases were maintained for periodic updates of the on-line system. Total disk storage for on-line data bases was the order of several million bytes. Delivery of the prototype was scheduled for the end of August of this year with the data bases shortly thereafter. ERA

N78-29782# Connecticut Dept. of Transportation, Wethersfield. Bureau of Planning and Research.

DEVELOPMENT OF A LABORATORY DATA SYSTEM EXECUTIVE SUMMARY Progress Report, 1972 - 1978

Mar. 1978 16 p Sponsored by DOT
(PB-279765/2; FHWA/CT/RD-380-S-78-4) Avail: NTIS HC A02/MF A01 CSCL 09B

A computer system was designed to simplify and streamline the flow of data both within and outside of a materials testing laboratory handling up to 75,000 tests annually. Statistical programs facilitated assignment of inspection personnel and provided justification for reduced, and in some cases, increased frequency of testing on many items. GRA

N78-29784# National Bureau of Standards, Washington, D. C. Inst. for Computer Sciences and Technology.

MANAGEMENT OF DATA ELEMENTS IN INFORMATION PROCESSING Final Report
Hazel E. McEwen, ed. Apr. 1978 155 p refs Proceedings of the 3rd Natl. Symp. held at NBS, Gaithersburg, Md., 28-30 Sep. 1977
(PB-279661/3; NBSIR-78-1446) Avail: NTIS
HC A08/MF A01 CSCL 09B

Data element management in the field of health care, energy, paperwork management, trade data standards, and museum data is discussed. GRA

N78-30840# Los Alamos Scientific Lab., N. Mex.
COMPUTER GRAPHICS FOR EXTRACTING INFORMATION FROM DATA
Ronald K. Lohrding, Myrtle M. Johnson, and David E. Whiteman 1977 21 p refs Presented at the 3d ERDA Statist. Symp., Richland, Wash., 26-28 Oct. 1977
(Contract W-7405-eng-36)
(LA-UR-77-2456; Conf-771042-2) Avail: NTIS
HC A02/MF A01

Computer graphics which are useful for displaying and analyzing data are presented. Many classical and several newly developed graphical techniques in statistical data analysis are presented for small univariate and multivariate data sets. These include histograms, empirical density functions, pie charts, contour plots, a discriminant analysis display, cluster analysis, Chernoff faces, and Andrews' sine curves. Recent advances in data collection technology and computer data base management systems have made it imperative to utilize computer graphics for large data sets. Several innovative graphical techniques are presented to handle this situation. Spatial relationships among the data (particularly geographic data) are difficult to conceptualize. Several cartographic techniques are presented which enhance the understanding of these spatial relationships within the data. ERA

N78-30844# Swedish Council for Building Research, Stockholm.
PROCESSING LARGE COORDINATED-BASED DATA BANKS
Dipak Khakhar 1978 130 p refs
(PB-280070/4; ISBN-91-540-2822-1; D2-1978) Avail: NTIS
HC A07/MF A01 CSCL 09B

The use of how data bases in physical and social planning ought to be organized so that they can be transferred and combined easily for a particular application was studied. The Swedish road data base was used as an application for the calculation of shortest distances between some 3000 places and for the construction of a road distance table for Sweden. The results are derived from the distance table project, regarding the structuring and restructuring of data base for background map processing. GRA

N78-31768# Naval Ship Research and Development Center, Bethesda, Md.
FEASIBILITY STUDY FOR INCORPORATING A DATA STRUCTURE DEFINITION AND MANIPULATION FACILITY WITHIN THE COMRADE DATA MANAGEMENT SYSTEM Final Report
Irving S. Zaritsky May 1978 118 p refs
(ZF53532001)
(AD-A055097; DTNSRDC-78/045) Avail: NTIS
HC A06/MF A01 CSCL 09/2

A scheme is described for enhancing the COMRADE (Computer-Aided Design Environment) Data Management System. This scheme would produce benefits in data management efficiency, user convenience, power, and cost effectiveness by representing the data structure of a COMRADE data base apart from the data records and by adding a system specifically designed to handle pointer information. In particular, such techniques would: reduce COMRADE use of disk I/O for data block relationships; simplify the organization and administration of the data base; enable the use of a powerful data-definition/data manipulation language; enable the use of an inferential search mechanism; and permit existing programs involving pointer relationships to remain essentially unchanged. The degree of effectiveness achieved under this scheme can be further enhanced by giving the data base administrator a greater role in developing and maintaining the data base in a way to capitalize on the greater flexibility provided. The procedures involved in implementing the proposed scheme and the benefits to be realized from such a scheme are illustrated by describing a hypothetical COMRADE/GIRS system. GIRS (Graph Information Retrieval System) is an in-house developed system written in FORTRAN that is particularly efficient at manipulating pointers. It is easily portable to other machines. GRA

N78-31773# National Technical Information Service, Springfield, Va.
MICROCOMPUTERS: GENERAL APPLICATIONS. CITATIONS FROM THE NTIS DATA BASE Final Report, 1964 - May 1978
George W. Reimherr Jun. 1978 222 p Supersedes NTIS/PS-77/0325, NTIS/PS-76/0202 and NTIS/PS-75/251
(NTIS/PS-78/0609/4) Avail: NTIS HC $28.00/MF $28.00
CSCL 09B

This bibliography of Federally-funded research cites studies on the applications of minicomputers. These include process control, testing, navigation, instrumentation, biomedicine, machining, training, as well as other applications. GRA

N78-31774# National Technical Information Service, Springfield, Va.
MICROCOMPUTERS. PART 1: GENERAL APPLICATIONS. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Final Report, Mar. 1976 - Mar. 1977
George W. Reimherr Jun. 1978 198 p
(NTIS/PS-78/0611/0) Avail: NTIS HC $28.00/MF $28.00
CSCL 09B

The bibliography of worldwide research literature cites studies on the applications of microcomputers. These include process control, testing, navigation, instrumentation, biomedical, machine tools, and other applications. (This updated bibliography contains 191 abstracts, none of which are new entries to the previous edition.) GRA

N78-31775# National Technical Information Service, Springfield, Va.
MICROCOMPUTERS. VOLUME 4, PART 1: GENERAL APPLICATIONS. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Final Report, Apr. 1977 - May 1978
George W. Reimherr Jun. 1978 377 p Supersedes NTIS/PS-77/0327 and NTIS/PS-76/0204
(NTIS/PS-78/0612/8; NTIS/PS-77/0327; NTIS/PS-76/0204)
Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The bibliography of worldwide research literature cites studies on the applications of microcomputers. These include automotive, testing, navigation, instrumentation, biomedical, machine tools, and other applications. (This updated bibliography contains 370 abstracts, all of which are new entries to the previous edition.) GRA

N78-31776# National Technical Information Service, Springfield, Va.
MICROCOMPUTERS. VOLUME 3, PART 2: TELECOMMUNICATION APPLICATIONS. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Final Report, Mar. 1976 - Mar. 1978
William E. Reed Jun. 1978 98 p Supersedes NTIS/PS-77/0328 and NTIS/PS-76/0204
(NTIS/PS-78/0613/6; NTIS/PS-77/0328; NTIS/PS-76/0204)
Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The bibliography of worldwide research literature cites studies in telecommunication applications of microcomputers. Telephone, data transmission, teleprinters, facsimile communication, and communications controllers are among the applications cited. (This updated bibliography contains 91 abstracts, 48 of which are new entries to the previous edition.) GRA

N78-31777# National Technical Information Service, Springfield, Va.

MICROCOMPUTERS. VOLUME 3, PART 3: BASIC DESIGN AND DEVELOPMENT. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Final Report, Mar. 1976 - Mar. 1978
George W. Reimherr Jun. 1978 243 p
(NTIS/PS-78/0614/4) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The bibliography of worldwide research literature cites studies on the design and development of microcomputers. Studies on software development, chip development, LSI technology, and reliability and performance evaluation testing are included. (This updated bibliography contains 236 abstracts, none of which are new entries to the previous edition.) GRA

N78-31778# National Technical Information Service, Springfield, Va.
MICROCOMPUTERS. VOLUME 4, PART 3: BASIC DESIGN AND DEVELOPMENT. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Final Report, Apr. 1977 - May 1978
George W. Reimherr Jun. 1978 270 p Supersedes NTIS/PS-77/0329 and NTIS/PS-78/0610
(NTIS/PS-78/0615/1; NTIS/PS-77/0329; NTIS/PS-78/0610) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The bibliography of worldwide research literature cites studies on the design and development of microcomputers. Studies on software development, chip development, LSI technology, and reliability and performance evaluation testing are included. (This updated bibliography contains 283 abstracts, all of which are new entries to the previous edition.) GRA

N78-31779# National Technical Information Service, Springfield, Va.
MICROCOMPUTERS. PART 4: PROCESS CONTROL APPLICATIONS. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Final Report, 1970 - Mar. 1978
Guy E. Habercom, Jr. Jun. 1978 97 p
(NTIS/PS-78/0616/9) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

Industrial applications of microcomputers to expedite processes were investigated in these reports gathered in a worldwide literature survey. Such diversified industries as pulp mills, rubber processing industry, chemical plants, metal fabrication plants, and machine shops were researched to ascertain the effectiveness of microcomputers as a process control tool. Comparative analyses of microcomputers and their control systems are made. GRA

N78-32733# Naval Ship Research and Development Center, Bethesda, Md.
THE SHARP DATA BASE MANAGEMENT SYSTEM: USER INFORMATION MANUAL
Ben Wallis, Roy Hyde, and Teri Blake Aug. 1978 208 p refs
(AD-A055581; DTNSRDC-TM-188-76-1) Avail: NTIS HC A10/MF A01 CSCL 09/2

SHARP (Ships Analysis and Retrieval Program) is a self-contained generalized Data Base Management System developed and operational on DTNSRDC's CDC 6700 SCOPE 3.4 computer system. Data bases may be constructed, maintained, and queried interactively from remote terminals. English-like user oriented languages are used for data base definition, report definition, and query specifications. SHARP is also operational on the IBM 370, UNIVAC 70/45, UNIVAC 1108, and NOVA ECLIPSE computers. GRA

N78-32744# National Computer Center, Research Triangle Park, N. C.
EPA EXECUTIVE SEMINAR ON DATABASE MANAGEMENT SYSTEMS
David F. McAllister, ed. (North Carolina State Univ.) 1977 98 p Seminar held 25-26 Oct. 1977
(PB-281248/5) Avail: NTIS HC A05/MF A01 CSCL 09B

The objective of the EPA executive seminar was to acquaint EPA management with database management systems (DBMS) and how they can help the Federal Manager. Topics included the following: What can DBMS do for the Federal Manager. Organization considerations for successful DBMS. Case studies of DBMS, and are DBMS objectives achievable. Author

N78-32753# Ohio State Univ., Columbus. Computer and Information Science Research Center.
SIMULATION STUDIES OF THE DATABASE COMPUTER (DBC)
David K. Hsiao and Krishnamurthi Kannan Feb. 1978 38 p refs
(Contract N00014-75-C-0573)
(AD-A056048) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report consists of a series of simulation studies of the hardware throughput of a specialized machine known as the database computer (DBC). Although raw hardware performance of the DBC can be estimated in an order of 80 to 180 times that of conventional software-oriented database management systems, there is the need of knowing the DBC's response time to user access requests, load condition to various request types, and potential bottlenecks which may be caused by uneven performance matching of the key DBC components. The simulation studies are intended to address the need. The simulation programs are written in GPSS and run on an IBM 370/168. All of these results are plotted in graph form. Prediction of the results, interpretation of the graphs, and observation of the deviations are the main effort of the simulation studies. Very good conclusions are obtained concerning the DBC's response time, load condition, and throughput bottleneck. Author (GRA)

N78-32763# National Technical Information Service, Springfield, Va.
COMPUTER INFORMATION SECURITY AND PROTECTION, VOLUME 1. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Jun. 1977
David W. Grooms Aug. 1978 357 p
(NTIS/PS-78/0859/5) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The bibliography of Federally-funded research covers the various aspects of computer information security and computer privacy, including personal privacy, reliability of security procedures, natural disasters, audits, electronic crime, implications of the Privacy Act of 1974, and software design for efficiency checks. The military intelligence aspects of computer privacy and the private social implications are also included. (This updated bibliography contains 350 abstracts, none of which are new entries to the previous edition). GRA

N78-32764# National Technical Information Service, Springfield, Va.
COMPUTER INFORMATION SECURITY AND PROTECTION, VOLUME 2. CITATIONS FROM THE NTIS DATA BASE Progress Report, Jul. 1977 - May 1978
George W. Reimherr Aug. 1978 138 p Supersedes NTIS/PS-77/0629; NTIS/PS-76/0682; NTIS/PS-75/437
(NTIS/PS-78/0860/3; NTIS/PS-77/0629; NTIS/PS-76/0682; NTIS/PS-75/437) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The bibliography of Federally-funded research covers the various aspects of computer information security and computer privacy, including personal privacy, reliability of security procedures, natural disasters, audits, electronic crime, implications of the Privacy Act of 1974, and software design for efficiency checks. (This updated bibliography contains 50 abstracts, all of which are new entries to the previous edition). GRA

N78-32766# National Technical Information Service, Springfield, Va.
COMPUTER INFORMATION SECURITY AND PROTECTION. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - May 1978
George W. Reimherr Aug. 1978 57 p Supersedes NTIS/PS-77/0630; NTIS/PS-76/0683
(NTIS/PS-78/0861/1; NTIS/PS-77/0630; NTIS/PS-76/0683) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

Work accomplished on the Deep Space Network (DSN) was described, including the following topics: supporting research and technology, advanced development and engineering, system implementation, and DSN operations pertaining to mission-independent or multiple-mission development as well as to support of flight projects.

N79-10745 Duke Univ., Durham, N. C.
DYNAMIC FILE ALLOCATION IN A DISTRIBUTED DATA-BASE SYSTEM Ph.D. Thesis
James Edward Ames, IV 1977 94 p
Avail: Univ. Microfilms Order No. 7815855

A fundamental question of the dynamic file assignment problem is when to reassign the files. Presented are results of experiments designed to show the effect of different scheduling policies in the file assignment problem. The methodology for analyzing a real system with regard to the dynamic file assignment problem is also given. Finally, an algorithm which formalizes the process of dynamically distributing the files is discussed in detail. An event driven simulation model is developed for a hospital information system. The information needed by the parameterization process was gathered by a software monitor. The model was verified by comparing the results of the simulation to the results of an analytic model for three test systems. Validation is performed by comparing the results of the simulation to the performance measures collected directly from the actual information system.
Dissert. Abstr.

N79-10748 Texas Univ. at Austin.
CONFIGURATION OF DISTRIBUTED DATA BASE SYSTEMS WITH TREE TOPOLOGIES Ph.D. Thesis
Randolph Tau-yu Yeh 1978 215 p
Avail: Univ. Microfilms Order No. 7817738

An overview of distributed data base systems is first presented. Mathematical models for distributed systems are then classified and briefly discussed. A design methodology for distributed systems is suggested with an emphasis on a structured methodology and the use of models. Various design problems are defined and investigated; these include the optimal assignment of computing capacities, data base locations, and line capacities in two-level and multi-level star topology distributed systems; the design of two-level and multi-level distributed data base systems with tree topologies; and a case study in which an interactive network design aid package was developed to assist in the design of distributed system for the Department of Mental Health Mental Retardation of the State of Texas. For these problems, either the exact solution is presented, or a good heuristic approach is proposed.
Dissert. Abstr.

N79-10751 Cornell Univ., Ithaca, N. Y.
MODELS OF STORAGE STRUCTURES AND THE DESIGN OF DATABASE RECORDS BASED UPON A USER CHARACTERIZATION Ph.D. Thesis
Salvatore Tony March, Jr. 1978 301 p
Avail: Univ. Microfilms Order No. 7817867

A methodology to support systems analysts in the design of database systems is developed. Major contributions of the dissertation include: (1) the development of a generalized model of secondary memory management which significantly reduces the effort required to model alternative file organization designs; (2) the development of mathematical programming algorithms capable of determining efficient record segmentations for a wide range of database retrieval activity; and (3) the integration of these results with an existing approach to file organization design methodology capable of solving a large class of database design problems.
Dissert. Abstr.

N79-10760# National Technical Information Service, Springfield, Va.
DISTRIBUTED DATA PROCESSING. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Jun. 1978
George W. Reimherr Jul. 1978 90 p Supersedes NTIS/PS-77/0576
(NTIS/PS-78/0671/4; NTIS/PS-77/0576) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The bibliography of Federally-funded research cites studies on the concepts, design, development, implementation, and application of distributed data processing. Research on distributed data bases is included. This updated bibliography contains 84 abstracts, 29 of which are new entries to the previous edition.
GRA

N79-10761# National Technical Information Service, Springfield, Va.
DISTRIBUTED DATA PROCESSING. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Jun. 1978
George W. Reimherr Jul. 1978 141 p Supersedes NTIS/PS-77/0577
(NTIS/PS-78/0672/2) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The bibliography of worldwide journal literature cites studies on the concepts, design, development, implementation, and application of distributed data processing research on distributed data bases. This updated bibliography contains 134 abstracts, 72 of which are new entries to the previous edition. GRA

N79-11758# Pennsylvania Univ., Philadelphia. Dept of Decision Science.
DBLISP: A SEED/LISP INTERFACE USERS MANUAL
Ronald M. Lee Feb. 1978 16 p refs
(AD-A057320; Rept-78-02-04) Avail: NTIS HC A02/MF A01 CSCL 09/2

DBLISP consists of a set of functions which provide a direct interface between the SEED network database system (version B04) and UCI LISP. Described here are instructions for using DBLISP, a sample session and various technical comments.
Author (GRA)

N79-11760# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences.
DYNAMIC TECHNIQUES FOR RESTRUCTURING THE CONCEPTUAL SCHEMA - AN IMPLEMENTATION M.S. Thesis
Edward Nevin Beaver May 1977 69 p refs
(Contract N00014-75-C-0462)
(AD-A057318; Rept-77-08-02) Avail: NTIS HC A04/MF A01 CSCL 09/2

This work is a partial implementation of a dynamic restructuring processor. The total dynamic restructuring processor allows several generations of database structure to coexist. Restructuring occurs incrementally as data is accessed in the database. Only restructuring of the conceptual schema (as defined by the ANSI/SPARC report) is considered on a CODASYL type database system called WAND. The implementation uses generation data structures which allow several related schemas and databases to coexist with proper restructuring translation done on the fly. The scope of this implementation includes an analysis of data requirements and general implementation strategy for the total processor and detailed design and programming of routines that provide run-time translation from one schema definition and associated database to a user using another but related schema definition.
Author (GRA)

N79-12737 Illinois Univ. at Chicago Circle, Chicago.
DATABASE MODELING TECHNIQUES WITH APPLICATION TO FUZZY QUERY TRANSLATION Ph.D. Thesis
Jyh-seng Ke 1978 238 p
Avail: Univ. Microfilms Order No. 7824357

A formal model of database skeleton is developed to provide a unified foundation for database modeling and query translation. It is essentially the integration of three levels of data base abstraction: conceptual subschema, conceptual schema, and relational schema. A semi-automatic database modeling technique is developed to provide a tool for concisely defining database skeletons. A unique set of 4NF relations are constructed from the original set of user-specified basic conceptual graphs.

An extensible query language (XQL) is designed to provide an intelligent user interface for non-professional users. The XQL language allows the user to input his queries using a flexible language. The user's query need not be precise in the sense that imprecise, or fuzzy, concepts are included. The concepts of file and descriptor are transparent to the user. Techniques for efficient translation of XQL queries are described. Dissert. Abstr.

N79-12739 Syracuse Univ., N. Y.

A DATA BASE MANAGEMENT MODELING TECHNIQUES AND SPECIAL FUNCTION HARDWARE ARCHITECTURE Ph.D. Thesis

Gerard Thomas Capraro 1978 281 p

Avail: Univ. Microfilms Order No. 7823548

A mathematical base is developed that can be utilized to model data base management systems from the user level down to the bit level and to develop and evaluate proposed hardware that could be utilized to implement a data dictionary and part of a data directory. The mathematical modeling development is accomplished through set theory and the addition of order to sets. This mathematical base is used to define in detail some of the functions that must be performed in Data Base Management by operating on the following four levels of data: (1) the user computer interface (Reserved Word); (2) the attribute and file or relationship (F/R) names (Data Name); (3) the modifiers of the attribute and F/R names (Data Descriptors); and (4) the occurrences of the attributes and F/Rs (Data Occurrence). Hardware implementation designs are then considered for a subset of these functions and data levels. Dissert. Abstr.

N79-12747# Illinois Univ. at Urbana-Champaign, Urbana. Coordinated Science Lab.

A MODEL FOR A NATURAL LANGUAGE DATA BASE SYSTEM M.S. Thesis

Bradley Alan Goodman Oct. 1977 118 p refs

(Contract N00014-67-A-0305-0026)

(AD-A057641; R-798; UILU-ENG-77-2248) Avail: NTIS HC A06/MF A01 CSCL 09/2

A system called PLANES (for Programmed LANguage-based Enquiry System) is under development at this laboratory. The primary objective of PLANES is to allow a non-programmer to obtain information from a large data base with minimal prior training or experience. Such a system must understand a substantial degree of a user's natural language and guide and educate him to formulate requests in a form the system can understand. The system must handle complex syntactic structures, abbreviations, pronoun reference and ellipses. The system must also give back explicit answers and not just retrieve a file. Minor errors--such as spelling and grammatical errors--should be tolerated. The system should be interactive and on-line, provide clarifying dialogues, operate fairly rapidly, and should be relatively easy to extend. See also AD-A028 318 GRA

N79-12749# Massachusetts Inst. of Tech., Cambridge. Center for Information Systems Research.

AN APPROACH TO CONSTRUCTING FUNCTIONAL REQUIREMENT STATEMENTS FOR SYSTEM ARCHITECTURAL DESIGN

S. L. Huff and S. E. Madnick Jun. 1978 91 p refs

(Contract N00039-78-G-0160)

(AD-A057802; CISR-P010-7806-06; CISR-TR-6) Avail: NTIS HC A05/MF A01 CSCL 09/2

The objective of this study is to develop a systematic approach to the architectural design of complex software systems. In this report, the problem of creating functional requirements, which become the input to the design structuring methodology, is investigated. Presently available requirement statement languages, such as PSL (Problem Statement Language) are examined, and the conclusion is drawn that such schemes are not very appropriate for the expression of requirements prior to system design. Certain key concepts used frequently in the requirements analysis and specification literature are then examined and clarified, and related together in the context of a simple framework. An alternative approach to specifying requirements, based upon a set of requirement templates, is proposed and its application illustrated. Finally, the appendices contain detailed information regarding PSL syntax and semantics, as well as an application of the template approach to the requirements for a real-life database management system. GRA

N79-12752# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences.

THE DATA SYSTEM M.S. Thesis

Keith Allen Kimball 1978 68 p

(Contract N00014-75-C-0462)

(AD-A057321; Rept-78-04-03) Avail: NTIS HC A04/MF A01 CSCL 09/2

This thesis presents the DATA (Dynamic Alerting Transaction Analysis) System as an alternative to a conventional database management system. The DATA System contains no records corresponding to entities but rather is simply a time ordered list of transactions. The advantages of DATA in the areas of security, integrity, and operational ease is discussed and the concept of alerting is presented. An alerting system provides facilities to monitor changes to the database in order to perform some action whenever certain conditions become true. An alerter can be thought of as a program that continuously monitors the database and takes some specified action when the corresponding condition becomes true. The DATA system is an excellent tool to implement alerting due to its ability to view the database at previous points in time. The work describes the implementation of the DATA System. GRA

N79-13728# Massachusetts Inst. of Tech., Cambridge. Center for Information Systems Research.

AN EXTENDED MODEL FOR A SYSTEMATIC APPROACH TO THE DESIGN OF COMPLEX SYSTEMS

S. L. Huff and S. E. Madnick Jul. 1978 67 p refs

(Grant N00039-78-G-0160)

(AD-A058565; ISR-P010-7808-07; CISR-TR-7) Avail: NTIS HC A04/MF A01 CSCL 09/2

The objective of this study is to develop a systematic approach to the architectural design of complex software systems. This contract builds on earlier work, in which a graph modelling and decomposition methodology was used to operate upon a set of functional requirements and their interrelationships to generate an architectural design. In this report, certain extensions to the graph model employed to model the requirements are analyzed. Proposed extensions include: (1) implementation nodes; (2) weights on interdependency links; (3) links between implementation nodes; and (4) various types of directed links. The proposed extensions are applied to a small design problem (the design of a 22-requirement database management system) used in earlier work, and found to be implementable - that is, the information that must be supplied by a software designer to establish the model structure in a particular case can be determined in a reasonable length of time. Author (GRA)

N79-15947# Mitre Corp., Bedford, Mass.

IMPLEMENTATION OF A SECURE DATA MANAGEMENT SYSTEM FOR THE SECURE UNIX OPERATING SYSTEM

B. N. Wagner Jul. 1978 41 p refs

(Contract F19628-78-C-0001; AF Proj. 5720)

(AD-A058902; MTR-3524; ESD-TR-78-184) Avail: NTIS HC A03/MF A01 CSCL 09/2

A secure data management system that achieved a multilevel capability for building and accessing relations was implemented to run on the Secure UNIX Operating System for DEC PDP-11/45. The secure DMS is an adaptation of INGRES. The effect of multilevel security on the design of the INGRES data base system and its user interface, including implementation details and an evaluation of the system is addressed. GRA

N79-15871# National Technical Information Service, Springfield, Va.

RANDOM ACCESS MEMORIES. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Nov. 1978

Brian Carrigan Nov. 1978 196 p Supersedes NTIS/PS-77/1100; NTIS/PS-76/0997; NTIS/PS-75/811

(NTIS/PS-78/1221/7; NTIS/PS-77/1100; NTIS/PS-76/0997; NTIS/PS-75/811) Avail: NTIS HC $28.00/MF $28.00

CSCL 09B

A bibliography containing 27 abstracts concerning research reports on the design, development, and application of random access storage devices and materials is presented. Studies are included on wall placement techniques, domain wall observations, microcircuitry, and software development. GRA

N79-16672/# National Technical Information Service, Springfield, Va.

RANDOM ACCESS MEMORIES. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1974 - Nov. 1978

Brian Carrigan Nov. 1978 290 p Supersedes NTIS/PS-77/1111; NTIS/PS-76/0998

(NTIS/PS-78/1222/5; NTIS/PS-77/1111; NTIS/PS-76/0998) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

A bibliography containing 286 abstracts concerning research on the design, development, and application of random access computer storage devices is presented. Research on charge coupled devices in random access storage, random access memories in microprocessor applications, and reliability of random access memories are included. GRA

N79-17568/# Applied Research of Cambridge Ltd. (Canada).

COMPUTER REPRESENTATION OF THREE-DIMENSIONAL STRUCTURES FOR CAEADS Final Report

William J. Mitchell and Mary Oliverson Feb. 1978 199 p refs

(Contract DACA88-77-C-0001; DA Proj. FA7-62731-AT-41)

(AD-A052040; CERL-TR-P-86) Avail: NTIS HC A09/MF A01 CSCL 13/13

This report presents the findings of a study performed to provide a basis for the selection of a computerized representation of three-dimensional structures for the Computer-Aided Engineering and Architectural Design System (CAEADS). The project was divided into four interlinked phases: (1) Establishment of CAEADS requirements for a building and site description system; (2) Identification of criteria against which potential candidate base systems can be evaluated; (3) Survey of systems and techniques; and (4) Evaluation of candidate systems. It was found that development of a three-dimensional geometric data base system to support CAEADS will be a complex task, but it is feasible. No existing software which exactly matches the requirements could be identified, but a range of feasible implementation strategies which make use of existing available software exists. Strategies based upon the OXSYS system (Applied Research of Cambridge Ltd.), the Evans and Sutherland Design System (Evans and Sutherland Computer Corporation), and GLIDE (Carnegie-Melon University) are most highly recommended. Author (GRA)

N79-17569/# Computer Corp. of America, Cambridge, Mass.

SPATIAL DATA MANAGEMENT SYSTEM Quarterly Report, 1 Jun. - 31 Aug. 1978

Christopher F. Herot, Jim Schmolze, Richard Carling, Mark Friedell, and Jerry Farrell 31 Aug. 1978 43 p

(Contract MDA903-78-C-0122; ARPA Order 3487)

(AD-A061207) Avail: NTIS HC A03/MF A01 CSCL 05/2

This report describes the third quarter of work on the design and implementation of a prototype Spatial Data Management System (SDMS). Spatial Data Management is a technique for organizing and retrieving information which enlists the user's sense of spatiality through the use of high bandwidth, color, interactive computer graphics. GRA

N79-17570/# Computer Corp. of America, Cambridge, Mass.

SPATIAL DATA MANAGEMENT SYSTEM Quarterly Report, 1 Mar. - 31 May 1978

Christopher F. Herot and Jim Schmolze 31 May 1978 57 p

(Contract MDA903-78-C-0122; ARPA Order 3487)

(AD-A061206) Avail: NTIS HC A04/MF A01 CSCL 05/2

This report describes the second quarter of work on the design and implementation of a prototype Spatial Data Management System (SDMS). Spatial Data Management is a technique for organizing and retrieving information by enlisting the user's sense of spatiality through the use of high bandwidth, color, interactive, computer graphics. GRA

N79-17571/# Computer Corp. of America, Cambridge, Mass.

PRELIMINARY DESIGN FOR SPATIAL DATA MANAGEMENT SYSTEM

Christopher F. Herot, Jim Schmolze, Richard Carling, and Jerry Farrell Jun. 1978 154 p refs

(Contract MDA903-78-C-0122; ARPA Order 3487)

(AD-A061032; CCA-78-09) Avail: NTIS HC A08/MF A01 CSCL 09/2

Spatial Data Management is a technique for organizing and retrieving information by positioning it in a Graphical Data Space. In contrast to conventional database management systems (DBMSs) which require that information be stored and retrieved by specifying attributes as numbers or strings of text, Spatial Data Management allows a user to employ the spatial location and visual appearance of information in order to find it. The underlying concept is that spatial location is, for many purposes, easier to remember and work with than the keywords of an ordinary DBMS. By allowing a datum to be stored in proximity to related pieces of information, a Spatial Data Management System (SDMS) frees the user of the need to know the exact name or location of the information that he seeks. Instead, he can locate it by 'browsing' until he finds something that he can identify visually. Spatial management of data can be combined with conventional DBMS techniques to yield a system which provides both means of access to information. GRA

N79-17572/# Computer Corp. of America, Cambridge, Mass.

SPATIAL DATA MANAGEMENT SYSTEM Quarterly Research and Development Technical Report, 1 Nov. 1977 - 28 Feb. 1978

Christopher F. Herot, James B. Rothnie, Jr., and Jerry Farrell 1978 54 p refs

(Contract MDA903-78-C-0122; ARPA Order 3487)

(AD-A061375) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report describes the design and implementation of a prototype spatial data management system (SDMS). Spatial Data Management is a technique for organizing and retrieving textual, symbolic, and pictorial information by positioning it in an Information Space maintained through the use of interactive computer graphics. The system currently under construction will employ a multiple channel color raster scan display to allow a user to organize his information within nested 'planes' of data over which he can manouver a window by the use of joy sticks. GRA

N79-18066*/# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.

INITIAL ECONOMIC AND OPERATIONS DATA BASE FOR DSS 13 AUTOMATION TEST

D. S. Remer and G. Lorden *In its* The Deep Space Network 15 Feb. 1979 p 78-85 ref

Avail: NTIS HC A09/MF A01 CSCL 09B

A summary is given of the data base collected for nine weeks of Deep Space Station II. Life cycle cost parameters on efficiency and productivity ratios, costs, and telemetry were calculated from this data base. L.S.

N79-18086 Wisconsin Univ. - Madison.

THE EVALUATION OF ABSTRACT DATA TYPES AS AN IMPLEMENTATION TOOL FOR DATABASE MANAGEMENT SYSTEMS Ph.D. Thesis

Anthony James Baroody, Jr. 1978 243 p

Avail: Univ. Microfilms Order No. 7822235

The application of current research on abstract data types and on generic procedures to the implementation of a network model database management system was examined. A generic procedure model of a database management system is presented and used to describe the techniques used in current systems to provide these descriptors to the data manipulation routines. To preserve data independence, an approach employing run-time interpretation is used. A simulation model is developed to compare the abstract data type model with the interpretive approach. The simulation model is used in combination with analytic modeling to study the locality of references to schema descriptors.

the effect of multiprogramming on system overhead, and the effect of mass storage I/O time on system performance.
Dissert. Abstr.

N79-19887 George Washington Univ., Washington, D. C.
A DESCRIPTIVE STUDY OF THE RELATIONSHIPS BETWEEN SELECTED ORGANIZATIONAL VARIABLES AND THE NATURE OF THE DATA BASE ADMINISTRATOR Ph.D. Thesis
Donald Gerald Pursley 1978 123 p
Avail: Univ. Microfilms Order No. 7904702

Despite the well-documented need for a systematic approach to the organizational development of the data base administrator (DBA), management was given few guidelines for implementing such a concept. This study focuses on providing such an approach so that the role of DBA, which was defined as the function within an organization which was responsible for the design, creation, integrity, efficiency, and administrative activities of a data base, can be effectively integrated into the managerial hierarchy. Empirical data was gathered on the DBA from a questionnaire mailed to 232 organizations that have this function. The questionnaire measures the environmental variables of stability, complexity, and sensitivity of the organizational data base and the complexity of the data base users. In addition, the organizational development of the DBA in terms of evolutionary pattern, organizational structure, and qualifications of those who man the function were measured. Dissert. Abstr.

N79-20784# Syracuse Univ., N. Y.
DATA SYNCHRONIZATION SCHEMES FOR MULTIPLE COPIED DATA BASES Final Technical Report, Jan. - Jun. 1978
Chin-Hwa Lee Griffiss AFB, N.Y. RADC Dec. 1978 143 p refs
(Contract F30602-75-C-0121; AF Proj. 5597)
(AD-A062967; RADC-TR-78-240) Avail: NTIS HC A07/MF A01 CSCL 09/2

In the network environment with distributed multiple-copied files, a lockout mechanism is required to guarantee the data synchronization. File access requests from geographically dispersed computer nodes have to be coordinated to maintain consistency of multiple-copied files. The advantages of a multiple-copied file in a loosely coupled computer communication network are its reliability to partial network failures and good response to real time file manipulation. In this report, the fundamental problems relating to the lockout synchronization of a multiple-copied file are presented from a new point of view. It can be shown that the file lockout state of the distributed multiple copes is an inherent characteristic of the file manipulation operations. The objective of this work was to determine the performance of data synchronization techniques in the maintenance of distributed multiple-copied files in a computer network using G.P.S.S. simulation. The system visualized is a set of identical copies of a file residing in nodes that form a computer network. Each file is supervised by a Local File Manager (L.F.M.) which is under a control scheme to maintain the congruency and consistency of these files by synchronizing the file access and updating information. This is achieved by locking out the file copes once an L.F.M. was granted the right of updating a file for a particular user. Author (GRA)

N79-20785# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
DEVELOPMENT OF A DATA DICTIONARY: FOR USE IN A DISTRIBUTED INTEGRATED DATABASE M.S. Thesis
Gordon K. Powell Aug. 1978 99 p
(AD-A062716; AFIT-CI-79-84) Avail: NTIS HC A05/MF A01 CSCL 09/2

A data dictionary was developed that can be used on an integrated database that is geographically distributed. The content, logical representation, and physical representation of the data dictionary were presented. A study of the best way to distribute this dictionary was made by simulating several proposed distributions. Thousands of messages were run against each simulated distribution. The best distribution was found after determining the average response time of a message.
Author (GRA)

N79-20786# Yale Univ., New Haven, Conn. Dept. of Computer Science.
MEMORY ORGANIZATION FOR NATURAL LANGUAGE DATA BASE INQUIRY
Jane L. Kolodner Sep. 1978 43 p refs
(Contract N00014-75-C-1111)
(AD-A062974; RR-142) Avail: NTIS HC A03/MF A01 CSCL 05/2

A natural language data-base query system, called CYRUS, is described. It stores and retrieves biographical information about people, making use of knowledge structures such as scripts and role themes in order to store the information in memory and guide the question answering process. Author (GRA)

N79-20787# Harry Diamond Labs., Adelphi, Md.
SMARTE: A COMPUTER PROGRAM FOR MANAGEMENT AND ANALYSIS OF ELECTROMAGNETIC PULSE TEST DATA
Thomas A. Rose Nov. 1978 197 p refs
(AD-A063079; HDL-TR-1868) Avail: NTIS HC A09/MF A01 CSCL 09/2

The SMARTE computer program, Release 2, is a specialized data base management and analysis program designed to process scientific data consisting of sets of amplitude versus time or amplitude and phase versus frequency coordinates. The data management capabilities allow for the creation, deletion, and editing of records. Records may be retrieved either explicitly by name or by conditional searches on record item values. Retrieved records may be (1) dumped to a storage device for later processing by other programs, (2) used as the subject of built-in and user specified reports, or (3) further analyzed with built-in analysis algorithms. The built-in analysis capabilities allow for the scaling, shifting, and combining of records. Additionally, Fourier transforms can be generated for time records. Each record may contain up to 512 coordinates. Each record also contains space for 128 items of descriptive information. One to five data bases can be controlled. Each data base can contain up to 90,000 records, where the actual limit depends on record size and storage capacity of the peripheral device employed for the data base. This document describes Release 2 of the SMARTE program, which is compatible with IBM 370 computer systems. GRA

N79-20788# Advisory Group for Aerospace Research and Development, Paris (France).
COMPUTER AID IN THE PRODUCTION DESIGN OFFICE
Jan. 1979 56 p In ENGLISH and partly in FRENCH Papers presented at the 47th Meeting of the AGARD Struct. and Mater. Panel, Florence, 25-28 Sep. 1978
(AGARD-CP-250; ISBN-92-835-0229-9) Avail: NTIS HC A04/MF A01

The requirements with respect to software and hardware from different points of view and the close relationship between CAD and CAM are presented. The application of CAD to special systems and components of an aircraft is covered.

N79-20789# Societe Nationale Industrielle Aerospatiale, Marignane (France.)
A COMPUTER AIDED DESIGN AND FABRICATION SYSTEM ADAPTED TO THE DESIGN OF THREE DIMENSIONAL OBJECTS [UN SYSTEME DE CONCEPTION ET FABRICATION ASSISTEES PAR ORDINATEUR ADAPTE A LA CONCEPTION DES OBJECTS TRIDIMENSIONNELS]
Monique Slass *In* AGARD Computer Aid in the Production Design Office Jan. 1979 5 p In FRENCH

Avail: NTIS HC A04/MF A01

Computer aided design and fabrication relies on all the capabilities of a data processor to create a product at the least cost, as rapidly as possible, and to provide for modifications in the shortest period of time. For its application, the Helicopter Division of Aerospatiale chose the design of three dimensional

objects. A FORTRAN program developed in the Scientific Information Service and used in industry since 1974, permits the creations and modification of simple and complex forms with the assistance of interactive graphic and alphanumeric screens. Development proceeds by taking into consideration the experience acquired by users. Favorable comparisons have been made with traditional methods. In order to rationalize the management of the created objects, an introduction to a new type of data base management system is under study.
Transl. by A.R.H.

N79-20764# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).
SOME REQUIREMENTS FOR A COMMUNICATION SYSTEM GUIDING THE RELATIONS BETWEEN THE DESIGN ENGINEER AND A GENERAL DATA BASE
W. Lehnert *In* AGARD Computer Aid in the Production Design Office Jan. 1979 4 p

Avail: NTIS HC A04/MF A01
Complete support of the designer in all phases of the design process is provided. A model for possible cooperation during the development of the communication system is described in order to achieve standardized components. S.E.S.

N79-2077[illegible] British Aerospace Aircraft Group, Weybridge (England).
A DISCUSSION OF THE PRODUCTION DESIGN OFFICE BENEFITS OF C.A.D.
L. H. Dyson *In* AGARD Computer Aid in the Production Design Office Jan. 1979 4 p

Avail: NTIS HC A04/MF A01
Mathematical models representing the different trends in the aircraft industry are presented. The different design phases, design processes, improvements, production engineering, cost reductions, data bases are reported. S.E.S.

N79-21778 Northwestern Univ., Evanston, Ill.
AN ANALYSIS OF THE INFORMATION PRESERVING PROPERTIES OF RELATIONAL DATABASE TRANSFORMATIONS Ph.D. Thesis
Adarsh Kumar Arora 1978 86 p
Avail: Univ. Microfilms Order No. 7907848
The extent to which an important class of relational database transformations preserves information was examined. A formal characterization of information content based on the set of functional and nonfunctional associations among attributes of a relational database are reported. Formal conditions are presented indicating the extent to which these associations are preserved. The information preserving properties of several well-known relational transformations are described. Some problems in maintaining these properties under updates are discussed.
Dissert. Abstr.

N79-21779 California Univ., Los Angeles.
COORDINATION IN DISTRIBUTED SYSTEMS: CONCURRENCY, CRASH RECOVERY AND DATABASE SYNCHRONIZATION Ph.D. Thesis
Daniel Alberto Menasce 1978 307 p
Avail: Univ. Microfilms Order No. 7907874
A locking protocol to coordinate access to a distributed database and to maintain system consistency throughout normal and abnormal conditions is presented. The protocol is robust in the face of failures of any participating site and in the face of network partitioning. Recovery is done in such a way that maximum forward progress is achieved. The proposed protocol supports the integration of virtually any locking discipline including predicate locking methods. A cost and delay analysis of the protocol reveals that its performance does not depend on the size of the network for most topologies of interest. The protocol is formally described using state transition diagrams and a proof of its correctness is included. A proposal for an extension aimed at optimizing operation of the protocol to adapt to highly skewed distributions of activity is also presented. Dissert. Abstr.

N79-21786# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
DATA MODEL EQUIVALENCE
Sheldon A. Borkin Dec. 1978 38 p refs Presented at the 4th Intern. Conf. on Very Large Data Bases, West Berlin, Sep. 1978
(Contract N00014-75-C-0661)
(AD-A062753; MIT/LCS/TM-118) Avail: NTIS HC A03/MF A01 CSCL 05/2
The current proliferation of proposals for database system data models and the desire for database systems which support several different data models raise many questions concerning equivalence properties of different data models. To answer these questions, one first needs clear definitions of of the concepts under discussion. This paper presents formal definitions of the terms database, operation operation type, application model and data model. Using this formal framework, database state equivalence, operation equivalence, application model equivalence and data model equivalence are distinguished. Three types of application and data model equivalence are defined -isomorphic, composed operation and state dependent. Possibilities for partial equivalences are mentioned. Implementation implications of these different equivalences are discussed. Examples are presented using two semantic data models, the semantic relation data model and the semantic graph data model. GRA

N79-22777# General Research Corp., McLean, Va.
AUTOMATED PERSONNEL DATA BASE SYSTEM SPECIFICATIONS, TASK 5 Final Report
Hugh J. Bertley, Alexander K. Bocast, Francis O. Deppner, Oscar J. Harrison, and Irene W. Kraas Nov. 1978 157 p
(PB-291848/0; NUREG-CR-0045) Avail: NTIS HC A08/MF A01 CSCL 09B
Development of qualification requirements, training programs, career plans, and methodologies for effective management and training of inspection and enforcement personnel were studied. Task 5 required the development of an automated personnel data base system for NRC/IE. This system is identified as the NRC/IE Personnel, Assignment, Qualifications, and Training System (PAQTS). The documentation for PAQTS including the functional requirements document (FRD), the data requirements document (DRD), the hardware and software capabilities assessment, and the detailed implementation schedule are provided. GRA

N79-22871 Texas Univ. at Austin.
A HIERARCHICAL DESIGN AND MODELING METHODOLOGY FOR DATA BASE SYSTEMS Ph.D. Thesis
Jerry Wayne Baker 1978 246 p
Avail: Univ. Microfilms Order No. 7910828
A two phase approach to the design and implementation of a data base management system (DBMS) is described and illustrated. In the first phase a performance model of the DBMS is developed from an abstract, formal specification of its functional properties. This model is derived through a top-down, step-wise refinement process using hierarchical and modular programming techniques. At successive points in the refinement process the DBMS model is combined with an application model, a state model, a virtual machine model, and a target machine model to provide a complete system (DBS). Feedback from the evaluation process is used to ensure that the design will satisfy specified performance requirements. The complete DBMS implementation is derived in the second phase by filling in the details left unspecified in the modeling process. Dissert. Abstr.

N79-23063# General Electric Co., Daytona Beach, Fla. Space Div.
SYSTEM DESCRIPTION: AVIATION WIDE-ANGLE VISUAL SYSTEM (AWAVS) COMPUTER IMAGE GENERATOR (CIG) VISUAL SYSTEM Final Report
D. V. Morland Feb. 1979 84 p refs
(Contract N61339-78-C-0048)
(AD-A065080; NAVTRAEQUIPC-78-C-0048-1) Avail: NTIS HC A05/MF A01 CSCL 09/2
This report provides an overall description of the Aviation Wide Angle Visual System (AWAVS) Computer Image Generator

(CIG) System installed at the Naval Training Equipment Center in Orlando, Florida. The report includes descriptions of system functions and capabilities, system hardware and new technology features incorporated in the CIG System design. Author (GRA)

N79-24665# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).

COMPUTER RESOURCE PERFORMANCE MANAGEMENT A TOTAL DATA CENTRE APPROACH

E. N. vanDeventer and J. D. Roode Nov. 1978 45 p refs
(CSIR-TWISK-54) Avail: NTIS HC A03/MF A01

A Computer Resource Performance Management (CRPM) system is based on a total data center approach and uses a management information data base to support four different but integrated management functions. The performance measurement management and tuning, performance data analysis, and resource performance management functions are discussed. The performance prediction and modelling function is described, which is based upon an operational analysis multiclass queuing network model results indicate that such an integrated CRPM system is an indispensable tool in the objective approach to computer installation management. S.E.S.

N79-25100*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.

PRELIMINARY MAINTENANCE EXPERIENCE FOR DSS 13 UNATTENDED OPERATIONS DEMONSTRATION

D. S. Remer and G. Lorden (California Institute of Technology) *In its* the Deep Space Network 15 Jun. 1979 p 150-161 refs
Avail: NTIS HC A11/MF A01 CSCL 09B

The maintenance data base collected for 15 weeks of recent unattended and automated operation of DSS 13 is summarized. During this period, DSS 13 was receiving spacecraft telemetry while being controlled remotely from JPL in Pasadena. Corrective and preventive maintenance manhours are reported by subsystem for DSS 13 including the equipment added for the automation demonstration. The corrective and preventive maintenance weekly manhours at DSS 13 averaged 22 and 40, respectively. The antenna hydraulic and electronic systems accounted for about half of the preventive and corrective maintenance manhours for a comparable attended DSN station, DSS 11. M.M.M.

N79-25777# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.

EQUIVALENCE PROPERTIES OF SEMANTIC DATA MODELS FOR DATABASE SYSTEMS Ph.D. Thesis

Sheldon A. Borkin Jan. 1979 315 p refs
(Contract N00014-75-C-0661)
(AD-A066386; MIT/LCS/TR-206) Avail: NTIS HC A14/MF A01 CSCL 09/2

A data model defines the types of structures present in a database and the types of operations which may be used to alter the database. An understanding of data model equivalence properties is necessary if one wishes to implement a system which presents different uses with views of a database in terms of differing data models or which provides a common interface to several database systems defined in terms of different data models. Requisites for this understanding are formal definitions of the involved concepts and a formal framework in which different data models can be compared. This thesis presents formal definitions of the terms database, operation, operation type, application model. Database state equivalence, operation equivalence, application model equivalence and data model equivalence are distinguished. Three types of application and data model equivalence are defined - isomorphic, composed operation and state dependent. Implementation implications of these different equivalences are discussed. It is proved that the semantic graph and the restricted semantic relation data models are state dependent equivalent. Observations on the network vs. relational data model 'controversy' are presented. Suggestions for applications of this research include a dual semantic data model interface. GRA

N79-25778# Rome Air Development Center, Griffiss AFB, N.Y.

A DATA BASE MANAGEMENT MODELING TECHNIQUE AND SPECIAL FUNCTION HARDWARE ARCHITECTURE

Gerard T. Capraro and P. Bruce Berra Jan. 1979 263 p refs
(AF Proj. 2328)
(AD-A066722; RADC-TR-79-14) Avail: NTIS HC A12/MF A01 CSCL 09/2

This research is concerned with the development of a mathematical base that can be utilized to model data base management systems from the user level down to the bit level and to develop and evaluate proposed hardware that could be utilized to implement a data dictionary and part of a data directory. The mathematical modeling development is accomplished through set theory and the addition of order to sets. This mathematical base is used to define in detail some of the functions that must be performed in Data Base Management (DBM) by operating on the following four levels of data: (1) the user computer interface (Reserved Word); (2) the attribute and file or relationship (F/R) names (Data Name); (3) the modifiers of the attribute and F/R names (Data Descriptors); and (4) the occurrences of the attributes and F/Rs (Data occurrence). Hardware implementation designs are then considered for a subset of these functions and data levels. The data levels considered are the Data Name and Data Descriptor Levels. Specifically, hardware designs are developed for the data and functions performed by a Data Dictionary and parts of a Data Directory. Given the proposed hardware implementation the final step in this research is to evaluate this hardware by comparing its processing times with the processing times for a conventional sequential computer. GRA

N79-25780# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences.

EXPLORING THE CONCEPT OF A CODASYL DATABASE MACHINE

Richard D. Hackathorn Jan. 1979 34 p refs
(Contract N00014-75-C-0440)
(AD-A067249; Rept-78-12-04) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper explores the concept of a database machine using the approach of the CODASYL data model. A database machine is defined as an integration of hardware and software for providing generalized database management capability in a physically separate device. The advantages of a database machine, along with functional specifications, are presented. Next, an illustration of using a database machine is given through an example of invoice processing using the SEED database management system on a DECsystem-10 computer. Finally, the implications of several design alternatives arising from the illustration are discussed. Author (GRA)

N79-26890# Computer Corp. of America, Cambridge, Mass.

A DISTRIBUTED DATABASE MANAGEMENT SYSTEM FOR COMMAND AND CONTROL APPLICATIONS Semiannual Technical Report, 1 Jul. - 31 Dec. 1978

30 Jan. 1979 152 p refs
(Contract N00039-77-C-0074)
(AD-A068181; CCA-79-12; SATR-4) Avail: NTIS HC A08/MF A01 CSCL 09/2

The primary focus of this project is to design and implement a distributed database management system called SDD-1 (System for Distributed Databases). SDD-1 is specifically oriented toward command and control applications and will be installed and tested in the Advanced Command and Control Architectural Testbed at the Naval Ocean Systems Center in San Diego. SDD-1 is a system for managing databases whose storage is distributed over a network of computers. Functionally, SDD-1 provides the same capabilities that one expects of any modern database management system, and users interact with it precisely as *if it* were not distributed. Systems like SDD-1 are appropriate for applications which exhibit two characteristics: (1) the activity requires an integrated database -- i.e. the activity entails access to a single pool of information by multiple persons, organizations, or programs; and (2) either the users of the information or its sources are distributed geographically. Military command and control exhibits these two characteristics. GRA

N79-28893\# Computer Corp. of America, Cambridge, Mass.
DATACOMPUTER AND SIP OPERATIONS Final Technical Report for period ending 1978
Donald E. Eastlake, III, Matthew Maltzman, and Joanne Z. Sattley 30 Mar. 1979 83 p refs
(Contract N00039-78-C-0248; ARPA Order 3540)
(AD-A068608; CCA-79-11) Avail: NTIS HC A05/MF A01 CSCL 09/2

During 1978, Computer Corp. of America offered very large on-line data storage and retrieval services on the Datacomputer in support of the seismic community data activities and for general use. The Datacomputer is a system designed to allow convenient and timely access to large on-line databases for multiple remote users communicating over a network. The Datacomputer is only operational general purpose database system capable of handling data sets in excess of a trillion bits. Copious and inexpensive storage is a unique feature of the CCA Datacomputer, made possible by the incorporation of an Ampex Tera-Bit Memory System (TBM). The TBM at CCA was the first public installation of this video-tape technology based system. The CCA installation is configured to hold up to 175 billion bits on-line with four TBM tape drives. Additional data (almost entirely seismic) is stored in off-line TBM. GRA

N79-28897\# Ohio State Univ., Columbus. Computer and Information Science Research Center.
THE CLUSTERING AND SECURITY MECHANISMS OF DATABASE COMPUTER (DBC)
Jayanta Banerjee, David K. Hsiao, and Jaishankar Menon 6 Apr. 1979 118 p refs
(Contract N00014-75-C-0573)
(AD-A068815; OSU-CISRC-TR-79-2) Avail: NTIS HC A06/MF A01 CSCL 05/2

The database computer (DBC) is a specialized back-end computer which is capable of managing data of 10 to the 10th power bytes in size and supporting known data models such as relational, network, hierarchical and attributed-based models. It is also one of the first database machines to have a built-in security mechanism for access control and a clustering mechanism for performance enhancement. In this report, we demonstrate how the important and essential functions of access control and clustering are carried out in DBC. Since these functions are carried out mostly in the database command and control processor (DBCCP) and the security filter processor (SFP), the report will be devoted largely to these two components of DBC. GRA

N79-28902\# Naval Intelligence Processing System Support Activity, Alexandria, Va.
THE IMPACT OF DBMS ON ADP MANAGEMENT
Mar. 1979 27 p
(AD-A068444) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper describes the impact of implementing a major database management system (DBMS) in a batch data processing environment and the changes which have transpired in the four years since IDMS was installed. Emphasis is on the management view of the change and what future trends in management requirements can be expected based on past experience. GRA

N79-28907\# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
A SEMANTIC DATA BASE MODEL AND ITS ASSOCIATED STRUCTURED USER INTERFACE Ph.D. Thesis
Dennis McLeod Aug. 1978 381 p refs
(Contract N00014-76-C-0944)
(AD-A068112; MIT/LCS/TR-214) Avail: NTIS HC A17/MF A01 CSCL 09/2

The conventional approaches to the structuring of data bases provided in contemporary data base management systems are in many ways unsatisfactory for modelling data base application environments. The features they provide are too low-level, computer-oriented, are representational to allow the semantics of a data base to be directly expressed in its structure. The semantic data model (SDM) has been designed as a natural application modeling mechanism that can capture and express the structure of an application environment. The features of the SDM correspond to the principal intensional structures naturally occurring in contemporary data base applications. The SDM provides a rich but limited vocabulary of data structure types and primitive operations, striking a balance between semantic expressibility and the control of complexity. Furthermore, facilities for expressing derived (conceptually redundant) information are an essential part of the SDM; derived information is as prominent in the description of an SDM data base as is primitive data. The SDM is designed to enhance the effectiveness and usability of data base systems. There are many data base management systems in use today which represent a considerable investment on the parts of their developers and users; the SDM can be effectively used in conjunction with these existing data base systems to enhance their effectiveness and usability. GRA

N79-28908\# Computer Corp. of America, Cambridge, Mass.
SPATIAL DATA MANAGEMENT SYSTEM Quarterly Research and Development Technical Report, 1 Dec. 1978 - 28 Feb. 1979
Christopher F. Herot, David Kramlich, Richard Carling, Mark Friedell, and Jerry Farrell 28 Feb. 1979 86 p refs
(Contract MDA903-78-C-0122; ARPA Order 3487)
(AD-A068451) Avail: NTIS HC A05/MF A01 CSCL 09/2

This fifth quarter of work on the design and implementation of a prototype Spatial Data Management System (SDMS) resulted in the addition of several new capabilities to the operational prototype. These capabilities provide: (1) a means of controlling the detail at which data is presented, and (2) additional flexibility in the appearance of graphical displays of symbolic data. In addition, a mechanism for maintaining the correspondence between symbolic and graphical forms of data was designed and will be implemented during the coming two quarters. GRA

N79-28950\# Kansas State Univ., Manhattan. Dept. of Computer Science.
FUNCTIONALLY DISTRIBUTED COMPUTING SYSTEMS USER FACILITY DEVELOPMENT Final Report, 1 Jan. 1978 - 31 Jan. 1979
Fred Maryanski 31 Jan. 1979 13 p refs
(Grant DAAG29-78-G-0018)
(AD-A068393; ARO-15552.1-EL) Avail: NTIS HC A02/MF A01 CSCL 09/2

Under a grant from the Army Research Office, Kansas State University investigated and studied the feasibility of establishing the multiple minicomputers of the School of Aerospace Medicine into a network of computer resources. A PDP 11/70 and a PDP 11/34 were acquired for use as host computer in a distributed processing configuration. Simulations were written to test the network concept prior to installation. The report describes the result of the investigation. GRA

N79-32046 Massachusetts Univ., Amherst.
UPDATE SYNCHRONIZATION IN MULTIACCESS DATABASE SYSTEMS Ph.D. Thesis
Milan Milenkovic 1979 148 p
Avail: Univ. Microfilms Order No. 7920872

A unified approach to concurrency control in both centralized and distributed database systems is presented. The use of the same conceptual tools to solve both problems results in reduced storage and computational overhead, increased overall efficiency, and simplicity of comprehension and implementation when applied to distributed database systems. A simple and efficient mechanism for synchronization of concurrent updates in the database systems with centralized concurrency control is proposed. Two different algorithms, based on deadlock prevention, are devised to meet the requirements of different types of transactions. Two decentralized solutions to the specialized problems of relocation and accessing of shared and migrating modules in distributed processing systems are also presented. It is demonstrated that both solutions guarantee efficient accessing of any module in finite time despite its migrations among the nodes of the system. Dissert. Abstr.

N79-32859# Arizona State Univ., Tempe.
A SIMULATION TECHNIQUE FOR ENHANCING CODASYL DATABASE IMPLEMENTATIONS Ph.D. Thesis
Alan Bier 1979 349 p
Avail: Univ. Microfilms Order No. 7919187

The structural concepts and organization of CODASYL DBTG database systems are presented. The objectives, functions and features of these systems are profiled, and the database design process is described in terms of its logical, physical and implementation aspects. The access mechanisms built into the CODASYL database systems are examined, and it is seen that the implementation of a secondary index can serve to improve performance. Various file organizations which are candidates for organizing the secondary index are evaluated with respect to storage requirements and functional efficiency. File organization performance is defined and contributing factors are identified. The selection of a suitable storage device is seen to play a large role in determining performance. A system level database design and implementation model which is specifically tailored towards CODASYL DBTG database systems is developed.
Dissert. Abstr.

N79-32880# Wisconsin Univ. - Madison. Mathematics Research Center.
QUERY EXECUTION IN DIRECT
David J. DeWitt Mar. 1979 18 p refs
(Contract DAAG29-75-C-0024; Grants NSF MCS-78-01721; NSF MCS-77-08968)
(AD-A070195; MRC-TSR-1935) Avail: NTIS HC A02/MF A01 CSCL 09/2

In this paper query organization, execution, and optimization in the database machine DIRECT are discussed. We demonstrate that the use of a monitor for each relation referenced by a query along with the use of the NEXT PAGE construct permits the DIRECT back-end controller to assign a query to any number of processors for execution. Furthermore, these constructs also permit the controller to balance the load in the back-end by dynamically adjusting how many processors are assigned to each executing query. We also identify the problem of relation fragmentation which occurs when a query is executed by several processors in parallel and develop a technique for estimating the optimal number of processors to compress a relation so that the execution time of the entire query is minimized. These results appear to be applicable to all database machines which employ parallel processing techniques to enhance query execution.
GRA

N79-32882# National Physical Lab., Teddington (England). Div. of Numerical Analysis and Computer Science.
THE NPL IMPLEMENTATION OF LEVEL 2 OF THE X25 INTERFACE
B. E. Aldous May 1979 29 p ref
(NPL-DNACS-18/79) Avail: NTIS HC A03/MF A01

The implementation of level 2 of the CCITT recommendation, X25, for the interface between data terminal equipment and data circuit-terminating equipment operating in the packet mode on public data networks is described. This implementation, together with the remainder of the X25 recommendation, is for inclusion in a multi-microprocessor interface computer, built at the NPL, for conversion from the X25 interface to that employed in the European Informatics Network (EIN). Subjects covered a general overview of the complete interface computer, the EIN Matching Unit, a brief functional description of the level 2 implementation, and a detailed description of the software procedures employed.
Author (ESA)

N79-33868*# National Aeronautics and Space Administration. Earth Resources Labs., Bay St. Louis, Miss.
PROCEDURE FOR EXTRACTION OF DISPARATE DATA FROM MAPS INTO COMPUTERIZED DATA BASES
Bobby G. Junkin Washington Oct. 1979 23 p refs
(NASA-RP-1048) Avail: NTIS HC A02/MF A01 CSCL 09B

A procedure is presented for extracting disparate sources of data from geographic maps and for the conversion of these data into a suitable format for processing on a computer-oriented information system. Several graphic digitizing considerations are included and related to the NASA Earth Resources Laboratory's Digitizer System. Current operating procedures for the Digitizer System are given in a simplified and logical manner. The report serves as a guide to those organizations interested in converting map-based data by using a comparable map digitizing system.
Author

N79-33873# National Bureau of Standards, Washington, D. C. Application Systems Div.
COMPUTER SCIENCE AND TECHNOLOGY: DATA BASE REORGANIZATION: PRINCIPLES AND PRACTICE Final Report
Gary H. Sockut and Robert P. Goldberg (BGS Systems, Inc., Lincoln, Mass.) Apr. 1979 57 p refs
(PB-295425/3; NBS-SP-500-47; LC-79-600055) Avail: NTIS HC A04/MF A01 CSCL 09B

The basic concepts of data base reorganization, including why it is performed are introduced. Examples of types of reorganization are described and classified into logical/physical levels. Pragmatic issues such as reorganization strategy, commercial reorganization facilities, case studies, and data base administration considerations are covered. Several research efforts are surveyed.
GRA

N79-33875# National Bureau of Standards, Washington, D. C. Center for Programming Science and Technology.
COMPUTER SCIENCE AND TECHNOLOGY: MODELING AND MEASUREMENT TECHNIQUES FOR EVALUATION OF DESIGN ALTERNATIVES IN THE IMPLEMENTATION OF DATABASE MANAGEMENT SOFTWARE Final Report
Donald R. Deutsch Jul. 1979 249 p refs
(PB-297846/8; NBS-SP-500-49; LC-79-600088) Avail: NTIS HC A11/MF A01 CSCL 09B

It is demonstrated that proposed DBMS designs can be evaluated through the use of performance prediction models based on prototype implementations and associated measurement systems. A set theoretic implementation of a DBMS with a relational user in interface as an object is used.
GRA

N79-33876# National Bureau of Standards, Washington, D. C. Inst. for Computer Sciences and Technology.
COMPUTER SCIENCE AND TECHNOLOGY: RECOMMENDATIONS FOR DATABASE MANAGEMENT SYSTEM STANDARDS Final Report, Special Publication
Aug. 1979 103 p refs
(PB-297848/4; NBS-SP-500-51; LC-79-600087) Avail: NTIS HC A06/MF A01 CSCL 09B

The need for data base standards within the Federal government was studied. Alternatives to Federal standards and actions of other standards bodies were considered along with the issues of standards adoption, timing, and impact on technology. Recommendations for standards and guidelines as well as the assumptions, benefits, and costs considerations used to justify the recommendations are presented.
GRA

N80-10009# Maryland Univ., College Park. Computer Science Center.
A SYSTEM FOR CONTROL STRUCTURE IMPLEMENTATION FOR IMAGE UNDERSTANDING
Martin Herman Mar. 1978 28 p refs
(Contract DAAG53-76-C-0138; ARPA Order 3206)
(AD-A071603; TR-648) Avail: NTIS HC A03/MF A01 CSCL 09/2

A data base system with inferencing capabilities is described. This system, developed by C. Rieger, is investigated as a tool in support of control structure implementation for image understanding.
GRA

N80-11794# Sandia Labs., Albuquerque, N. Mex.
TOWARD AUTOMATING THE DATABASE DESIGN PROCESS
P. L. Asprey 25 Apr. 1979 20 p refs Presented at 20th AESOP Conf., Gatlinburg, Tenn., 24 Apr. 1979
(Contract DE-AC04-76DP-00789)
(SAND-79-0858C; Conf-790431-3) Avail: NTIS HC A02/MF A01

An approach to designing complex, interrelated databases is described. The problems encountered and the techniques developed are discussed. A set of software tools to aid the designer and to produce an initial data base directly is presented. DOE

N80-12742 Virginia Polytechnic Inst. and State Univ., Blacksburg.
MULTIPROCESSOR ARCHITECTURES FOR SUPPORTING SECURE DATABASE MANAGEMENT Ph.D. Thesis
Robert Parker Trueblood 1979 194 p
Avail: Univ. Microfilms Order No. 7924148

A multiprocessor system supporting secure authorization with full enforcement (MULTISAFE) for database management is presented. The architecture of MULTISAFE combines the concepts of multiprocessing, pipelining, and parallelism to form a system organization partitioned into three modules: The user and application module (UAM), the data storage and retrieval module (SRM), and the protection and security module (PSM). Security is improved because it is physically impossible for a user to access the PSM or the SRM memories. The flow of messages in MULTISAFE is discussed and it is shown that this flow is secure. Abstract data operations on the data object message are used to describe the monitoring procedure for each module. Dissert. Abstr.

N80-12748*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
AUTOMATIC DATA PROCESSING EQUIPMENT (ADPE) ACQUISITION PLAN FOR THE MEDICAL SCIENCES
Aug. 1979 35 p
(JSC-16075) Avail: NTIS HC A03/MF A01 CSCL 09B

An effective mechanism for meeting the SLSD/MSD data handling/processing requirements for Shuttle is discussed. The ability to meet these requirements depends upon the availability of a general purpose high speed digital computer system. This system is expected to implement those data base management and processing functions required across all SLSD/MSD programs during training, laboratory operations/analysis, simulations, mission operations, and post mission analysis/reporting. M.M.M.

N80-12749# RDP, Inc., Waltham, Mass.
ATMOSPHERE EXPLORER MESA ACCELEROMETER DENSITY DATA BASE Final Report, 16 Mar. 1976 - 14 Jun. 1978
Robert W. Fioretti and Lawrence D. Cox 15 Jun. 1978 35 p refs
(Contract F19628-76-C-0169; AF Proj. 6690)
(AD-A072851; AFGL-TR-79-0062) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report describes the development of an extensive neutral atmospheric density data base generated from MESA accelerometer experiments. This data base represents the most extensive set of neutral density measurements in existence. Studies by AFGL scientists utilizing this data base are in preparation. GRA

N80-12781 Michigan Univ., Ann Arbor.
A STRUCTURED LOGICAL DATABASE DESIGN METHODOLOGY, VOLUMES 1 AND 2 Ph.D. Thesis
Beverly Katz Kahn 1979 458 p
Avail: Univ. Microfilms Order No. 7925171

Designing a data base is a difficult, complex and unstructured process. A methodology for improving that part of the data base design process that takes a set of many individual requirements specifications and transforms them into a single, consistent and complete logical data base structure for a specific data base management system is described. The logical data base design process proposed consists of sub processes which produce the following outputs: (1) local information structure, (2) global information structure, (3) entity structure, (4) revised entity structure, and (5) logical data base structure. This decomposition of the data base design process provides a greater degree of data independence and more flexible data base than the traditional two-level decomposition. Dissert. Abstr.

N80-12782 Columbia Univ., New York.
A SPECIFICATION OF DATA STRUCTURES WITH APPLICATION TO DATA BASE SYSTEMS Ph.D. Thesis
Maurice Bach 1979 219 p
Avail: Univ. Microfilms Order No. 7924847

A 'universal' data base model was constructed in order to compare the efficiency of different data base systems. The descriptive language used is based on a fragment of first order logic without quantifiers but with free individual variables. The use of such a language has great advantages as it has a well understood syntax and semantics. Unfortunately, its disadvantages include its reliance on inductive definitions and the fact that it is not a compact language. The language was applied to the description of several constructs common to many programming languages. The language was also used to describe the different types of data bases which are used today, including relational, hierarchical and network data base systems. Procedures for translating the 'conceptual' data model to 'storage' models are presented. Dissert. Abstr.

N80-12787 Washington Univ., Seattle.
PROCESSOR AND FILE ALLOCATION IN DISTRIBUTED DATA BASE SYSTEMS Ph.D. Thesis
Hugo Moorger 1979 216 p
Avail: Univ. Microfilms Order No. 7927844

An integrated view of distributed computer networks, computer communications and distributed data base systems is provided. Design and operational issues of distributed data bases are classified and discussed in detail. Efforts to model distributed data bases are surveyed and critically reviewed. A taxonomy for distributed data base design optimization models is presented. A three-level decision model to determine optimal processor allocation, file allocation and transaction routing decisions is developed and formulated as a mixed integer linear program. Specialized algorithms based on Benders' decomposition are specified for this model. Dissert. Abstr.

N80-12788 Polytechnic Inst. of New York.
THE SELF-ORGANIZING DATA BASE Ph.D. Thesis
Marsha Morch 1979 191 p
Avail: Univ. Microfilms Order No. 7920783

A relational data base design technique in which all relations are constructed dynamically is presented. Instead of a fixed structure in which different substructures are defined for different users, the relation structure described is constantly and automatically reorganized as new relationships are entered into the system. Thus, the single set of relations is derived from the various users' specifications and united in a single system view, and constantly changing to reflect current needs of users. A set of algorithms are described for synthesizing relations from functional dependencies by dynamic computation of the transitive closure and minimum covering set of relations. These algorithms form the core of an automated system which generates and manages many simultaneous differing views of the data, each of which incorporates the features of a conventional, statically-designed normalized relational data base. Dissert. Abstr.

N80-12792# Massachusetts Inst. of Tech., Cambridge. Center for Information Systems Research.
USE OF VIRTUAL MACHINES IN THE DEVELOPMENT OF DECISION SUPPORT SYSTEMS Final Technical Report, Sep. 1977 - Jan. 1979
John J. Donovan, Stuart E. Madnick, Chat-Yu Lam, and Tarek K. Abdel-Hamid Jul. 1979 251 p refs
(Contract F30602-77-C-0205; AF Proj. 5581)
(AD-A073748; RADC-TR-79-187) Avail: NTIS HC A12/MF A01 CSCL 09/2

This effort is composed of several studies that have been conducted to investigate the development of a software programming environment for decision support systems using virtual machine technology as an integrating tool. The final report combines the efforts of Reports 1-5 and highlights the merits of virtual machine technology as a software engineering tool. Report 1 examines various strategies for interfacing virtual machines. Report 2 examines these strategies and utilizes the

CIS System to demonstrate their applicability. Report 3 highlights the components of a Composite Information System (CIS). This system demonstrates multiple access to incompatible data bases using virtual machines. Report 4 utilizes the CIS system to demonstrate potential for enhancing decision-making in critical areas of SPO management. Finally, Report 5 develops the framework for a Composite Data System (COMPDATA). This system studies the interface problems of coordinating multiple-user access to multiple incompatible data base systems. GRA

N80-14751# IIT Research Inst., Chicago, Ill.
BASELINE SOFTWARE DATA SYSTEM. VOLUME 1: SYSTEM DESCRIPTION
Lorraine M. Duvall Griffiss AFB, N.Y. RADC Jul. 1979 45 p refs
(Contract F30602-77-C-0052; AF Proj. 5550)
(AD-A073358; RADC-TR-79-185-Vol-1) Avail: NTIS
HC A03/MF A01 CSCL 09/2

Volume I of this report provides a feature evaluation of the Management Data Query System (MDQS), a discussion of the contents of the Baseline databases, and a summary of the data required for software reliability modelling. Volume II is a reference guide for defining and retrieving data from the Baseline databases.
GRA

N80-14752# IIT Research Inst., Chicago, Ill.
BASELINE SOFTWARE DATA SYSTEM. VOLUME 2: DATABASE REFERENCE MANUAL Final Technical Report, Feb. 1977 - Aug. 1978
Lorraine M. Duvall and Christine Curtis Griffiss AFB, N.Y. RADC Jul. 1979 89 p refs
(Contract F30602-77-C-0052; AF Proj. 5550)
(AD-A073359; RADC-TR-79-185-Vol-2) Avail: NTIS
HC A05/MF A01 CSCL 09/2

The purpose of this manual is to provide the user of the Baseline Software Data System with a general capability for retrieving information from the data bases.
GRA

N80-16825*# General Electric Co., Huntsville, Ala. Space Div.
DATA BASE MANAGEMENT SYSTEM CONFIGURATION SPECIFICATION
James W. Neiers Oct. 1979 111 p
(Contract NAS8-33374)
(NASA-CR-161351; Rept-79HV013) Avail: NTIS
HC A06/MF A01 CSCL 09B

The functional requirements and the configuration of the data base management system are described. Techniques and technology which will enable more efficient and timely transfer of useful data from the sensor to the user, extraction of information by the user, and exchange of information among the users are demonstrated.
R.C.T.

N80-16826# Naval Underwater Systems Center, New London, Conn. New London Lab.
PERFORMANCE AND TIMELINESS IN A DATABASE
Lynn A. DeNoia 3 Jul. 1979 232 p refs
(ZF61112001)
(AD-A074552; NUSC-TR-6099) Avail: NTIS
HC A11/MF A01 CSCL 05/2

A methodology is presented for evaluating the system cost/performance of alternative approaches to distributed database management. For each type of database transaction, the management schemes are analyzed to identify the specific control paths and data flow requirements. Then the control and data flow information is used to develop a queueing network model of the entire system. Specific cost/performance analyses can be made when assumptions about particular operating characteristics (such as communication delays, processor power, and disk rates) are incorporated into the model. Average system response time and average network traffic are computed for four management approaches: centralized, a master/slave scheme, a sychronized scheme, and a new scheme called delayed synchronization. The new scheme is based on daily operation without synchronizing updates, supported by nightly merging to produce identical data copies throughout the system. Timeliness information is associated with every individual data item and users are given a choice in retrieval transactions between quick response and most recently updated values.
GRA

N80-16827# Maryland Univ., College Park. Dept. of Information Systems Management.
DATA MODEL PROCESSING: AN APPROACH TO STANDARDIZATION OF DATABASE MANAGEMENT SYSTEMS Technical Report, 1 Sep. 1978 - 28 Jul. 1979
W. Terry Hardgrave and Edgar H. Sibley 27 Jul. 1979 27 p refs
(Grant DAAG29-78-G-0182)
(AD-A074601; IFSM-TR-45; ARO-15712.3-A-EL) Avail: NTIS
HC A03/MF A01 CSCL 09/2

This paper outlines a general philosophy and framework for the specification of a data model. Extracts from scenarios that have been developed for specification of several well-known data models (e.g., DBTG, relational, TDMS) are given and discussed. These extracts are preliminary and incomplete, but they are used to illustrate the feasibility of the Data Model Processor Approach. The scenarios are intended for implementation of an augmented positional processor that will be able to support different data models and, through transformation, serve in defining and testing new DBMS standards.
GRA

N80-17718 California Univ., Berkeley.
THE EFFECTS OF CONCURRENCY CONTROL OF THE PERFORMANCE OF DATABASE MANAGEMENT SYSTEMS Ph.D. Thesis
Daniel Roland Ries 1979 218 p
Avail: Univ. Microfilms Order No. 8000487

The performance tradeoffs between parallelism and increased concurrency control overhead during simultaneous user updates of a database are studied using simulation models. The results indicate that in many cases course granularity such as file, relation, or record type locking is preferable. However, if all of the updates are small and randomly access the database, finer granularity, such as page or record locking becomes necessary. If the sizes and access patterns of updates vary considerably, a lock hierarchy with different sized locks is beneficial. The simulation results also indicate that with a high speed network and mostly local database activities, either primary site control or decentralized control algorithms are acceptable. As the network becomes slower, the decentralized control algorithms are preferable. If most of the database activities are distributed, however, the primary site approach can take advantage of its global knowledge to better schedule the processing of transactions and thus provide better performance than the decentralized algorithms. Dissert. Abstr.

N80-17720 Texas Univ. at Austin.
LOCKING MECHANISMS FOR CONCURRENCY CONTROL AND CONSISTENCY IN DATA BASE SYSTEMS Ph.D. Thesis
Sukho Lee 1979 166 p
Avail: Univ. Microfilms Order No. 7928321

Locking mechanisms, structural locking and semantic locking, are developed to control concurrency and maintain data base consistency. The structural locking mechanism allows precise specification of the locked data objects and thus can afford maximal concurrency via the realization of minimal locking. The set-oriented conflict test associated with the mechanism is simple and effective. Furthermore, when associative memories are in common use in data base machines, structural locking has unique characteristics to take advantage of this architecture. Semantic locking provides a mechanism for maintaining consistency between semantically dependent data objects in concurrency environment. The mechanism allows a system to enforce the appropriate consistency constraints when constraining data are updated.
Dissert. Abstr.

N80-17726# Army Engineer Waterways Experiment Station, Vicksburg, Miss.
RESULTS OF GEOTECHNICAL COMPUTER USAGE SURVEY Final Report
David P. Hammer and Robert D. Bennett Aug 1979 47 p refs
(AD-A073826; WES-MP-GL-79-19) Avail: NTIS
HC A03/MF A01 CSCL 09/2

Recognizing a need for improving automatic data processing (ADP) capabilities in the geotechnical field, the Office, Chief of Engineers, requested the U.S. Army Engineer Waterways Experiment Station to conduct a study to determine if geotechnical elements in the Corps of Engineers (CE) thought an upgrading of their ADP capabilities was needed and, if so, exactly what type of effort would be most beneficial. The first phase of this study consisted of a survey of various representative CE District and Division offices to investigate the state of the art in computer usage among CE geotechnical elements and compile what they considered to be their greatest needs. This report presents the results of that study. Based on the results of this survey, an upgrading in the area of geotechnical computer applications is apparently needed and desired by the majority of CE District and Division offices. Efforts toward accomplishing this should be directed toward increasing capabilities in the areas of (1) data-base management; (2) interactive graphics and plotting; and (3) technology transfer. GRA

N80-18728# Synectics Corp., Rome, N. Y.
AUTOMATED AIR INFORMATION PRODUCTION SYSTEM, PHASE 1. VOLUME 4: CHARTING SUBSYSTEM Final Technical Report, 28 Apr. 1977 - 28 Jul. 1978
J. Late and A. DiPasqua Sep. 1979 45 p refs 5 Vol.
(Contract F30602-77-C-0065)
(AD-A076107; RADC-TR-79-179-Vol-4) Avail: NTIS HC A03/MF A01

The requirements, functional design, and operational considerations of the Automated Air Information Production System charting subsystem are presented. The charting subsystem provides capture, revision, and output of graphic data appearing throughout the Defense Mapping Agency Aerospace Center flight information publications. The data are presented in digital form and techniques are provided to simplify alteration of the data. J.M.S.

N80-18729# Synectics Corp., Rome, N. Y.
AUTOMATED AIR INFORMATION PRODUCTION SYSTEM, PHASE 1. VOLUME 5: CARTOGRAPHIC EBR SYSTEM Final Technical Report, 28 Apr. 1977 - 28 Jul. 1978
Sep. 1979 41 p refs 5 Vol.
(Contract F30602-77-C-0065)
(AD-A076108; RADC-TR-79-179-Vol-5) Avail: NTIS HC A03/MF A01 CSCL 05/2

The design, fabrication, installation and testing an advanced large format, electron beam recorder for the production of computer generated master recordings on film is reported. Flight information products produced include: enroute high altitude charts; enroute low altitude charts; low altitude instrument approach procedure books; high altitude instrument approach procedure books; low altitude instrument departure procedure books; high altitude instrument departure procedure books; IFR supplements; VFR supplements; general planning books; area planning books; and area planning - special use airspace books. J.M.S.

N80-18730# Synectics Corp., Rome, N. Y.
AUTOMATED AIR INFORMATION PRODUCTION SYSTEM, PHASE 1. VOLUME 1: EXECUTIVE SUMMARY Final Technical Report, 28 Apr. 1977 - 28 Jul. 1978
N. Bottini and P. Nash Sep. 1979 65 p refs 5 Vol.
(Contract F30602-77-C-0065)
(AD-A076104; RADC-TR-79-179-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 05/2

An automated system designed to reduce the manual labor required for the revision and publication of information critical to flight operations and logistical planning is described. Response time between receipt of changes to air navigation/air facilities data and the dissemination of that data to all users is also improved. J.M.S.

N80-18731# Synectics Corp., Rome, N. Y.
AUTOMATED AIR INFORMATION PRODUCTION SYSTEM, PHASE 1. VOLUME 2: PUBLISHING SUBSYSTEM Final Technical Report, 28 Apr. 1977 - 28 Jul. 1978
S. Edelblum and S. Bowden Sep. 1979 145 p refs 5 Vol.
(Contract F30602-77-C-0065)
(AD-A076105; RADC-TR-79-179-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 05/2

An automated system developed to provide information critical to flight operations and logistical planning is described. The publishing subsystem permits publications to be produced on electronic equipment and extends the power and flexibility of digital manipulation to the updating and reformating of publications. J.M.S.

N80-18732# Synectics Corp., Rome, N. Y.
AUTOMATED AIR INFORMATION PRODUCTION SYSTEM, PHASE 1. VOLUME 3: AIR FACILITIES SUBSYSTEM Final Technical Report, 28 Apr. 1977 - 28 Jul. 1978
W. Nehl and P. Moulder Sep. 1979 134 p refs 5 Vol.
(Contract F30602-77-C-0065)
(AD-A076106; RADC-TR-79-179-Vol-3) Avail: NTIS HC A07/MF A01 CSCL 05/2

The requirements, functional design, and operational considerations of the Automated Air Facility Information File (AAFIF) are presented. The air facilities subsystem provides maintenance of the AAFIF data bases, selective data base retrieval, special report generation, and generation of formatted tape files for film negative output. J.M.S.

N80-18736# Wisconsin Univ. - Madison. Mathematics Research Center.
THE DESIGN AND IMPLEMENTATION OF A DATABASE MANAGEMENT SYSTEM USING ABSTRACT DATA TYPE
A. James Baroody, Jr. and David J. DeWitt Jun. 1979 57 p refs
(Contract DAAG29-75-C-0024; Grant NSF MCS-78-01721)
(AD-A077101; MRC-TSR-1970) Avail: NTIS HC A04/MF A01 CSCL 05/2

The design, implementation, and performance analysis of a database management system implemented using abstract data types are presented. The use of abstract data types as an implementation tool is shown to have several significant advantages over current implementation techniques. First, by using a combination of abstract data types and generic procedures to structure the design of a database system, the resulting software will be more reliable. Also, by employing a programming language which supports specification and verification of abstract data types, we can guarantee data independence. Finally, we demonstrate that the application of abstract data types permits the elimination of run-time interpretation of the schema and subschema such as in IBM's IMS, Univac's DMS110, and INGRES. Instead, the data manipulation routines, which are shown to be examples of generic procedures, are implemented as parameterized calls to the procedures bound to the instances of the three abstract data types used to represent the logical structure of the database. GRA

N80-18998# Boeing Computer Services, Inc., Seattle, Wash. Energy Technology Applications Div.
DISTRIBUTION DATA BASE DESIGN Final Report
D. J. Ingle Aug. 1979 59 p Sponsored by Elec. Power Res. Inst. 3 Vol.
(EPRI Proj. 1139-1)
(EPRI-EL-1150-Vol-1) Avail: NTIS HC A04/MF A01

An integrated distribution data base was designed and guidelines for economic evaluation and implementation of the design formulated. The conceptual design has a network structure which reflects the multiple-association relationship of the data. Implementation of the data base on a pilot basis is recommended. DOE

N80-18999# Boeing Computer Services, Inc., Seattle, Wash. Energy Technology Applications Div.
DISTRIBUTION DATA BASE DESIGN Final Report
D. J. Ingle Aug. 1979 308 p refs Sponsored by Elec. Power Res. Inst. 3 Vol.
(EPRI Proj. 1139-1)
(EPRI-EL-1150-Vol-2) Avail: NTIS HC A14/MF A01

The functional capabilities of the distribution data base are described along with economic evaluation of the system. DOE

N80-19867# Boeing Computer Services, Inc., Seattle, Wash. Energy Technology Applications Div.
DISTRIBUTION DATA BASE DESIGN Final Report
D. J. Inglis Aug. 1979 122 p refs Sponsored by Elec. Power Res. Inst. 3 Vol.
(EPRI Proj. 1139-1)
(EPRI-EL-1150-Vol-3) Avail: NTIS HC A06/MF A01

The practical implications of the distribution data base are presented. The data base logical design, physical implementation considerations, and digital mapping, are considered along with support system requirements and factors which effect implementation schedules. J.M.S.

N80-20889# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
DATA CAPTURE FOR CARTOGRAPHIC DATA BASES

Helmut Uhrig *In its* Rept. on Cartography and Topographical Meas. Ser. 2: Transl. 1978 p 102-113

Avail: NTIS HC A07/MF A01

The establishing of cartographic data bases from a 1:1 million map of the German Federal Republic showing administrative boundaries and from a world map of the same scale is described. It is concluded that only two digitizing procedures are valid; these are digitizing according to an original map of large scale or to an enlarged manuscript and digitizing 1:1. Author (ESA)

N80-23017# Rome Air Development Center, Griffiss AFB, N.Y.
A PLAN FOR AN AUTOMATED MANAGEMENT INFORMATION SYSTEM Final Report
Donald I. Zulch, Frank Rehm, Stephen Gross, Sharon Kaplesky, Dennis Maynard, Richard Gaudino, and G. Lamperti Dec. 1979 84 p
(AF proj. 9991)
(AD-A080137; RADC-TR-79-271) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report documents the results of an in-depth analysis of the management data bases that presently exist at RADC and defines a plan for achieving a fully automated management information system (MIS). A concept of a principal task is proposed and is defined. A method of achieving a smooth transition from the current data base structure to an automated MIS with on-line data entry and retrieval is suggested and finally a management structure supporting the MIS implementation is suggested. GRA

N80-23018# Ohio State Univ., Columbus. Computer and Information Science Research Center.
THE POST PROCESSING FUNCTIONS OF A DATABASE COMPUTER
David K. Hsiao and Jaishankar Menon Jul. 1979 38 p refs
(Contract N00014-75-C-0573)
(AD-A080128; OSU-CISRC-TR-79-6) Avail: NTIS HC A03/MF A01 CSCL 09/2

DBC is a specialized back-end computer which is capable of managing database of 10 to the 10th power bytes in size and supporting known data models such as relational, network, hierarchical and attribute-based. This report deals with the post processing functions of DBC. A description of some known methods for performing natural and implicit joins is first given. It then goes on to show how both natural and implicit joins are performed by the post processor (PP) of DBC utilizing the parallelism of PP. This report show that the algorithm for performing joins is of O(N) time, where N is the number of records to be joined. Algorithms necessary for performing set functions such as maxima, minima, average, sum and count are given. The time complexities of these algorithms are also calculated. Finally, it is shown how to implement the set inclusion operator. Given a set of values for a particular attribute and a number of retrieved records, this operator can select those records whose values for the attribute are the values in the set. GRA

N80-23021# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN EMITTER DATA MAINTENANCE AND RETRIEVAL SYSTEM M.S. Thesis
Clifford C. Gardner Dec. 1979 152 p refs
(AD-A080418; AFIT/GCS/EE/79-5) Avail: NTIS HC A08/MF A01 CSCL 05/2

The purpose of this thesis was to design and implement a system which maintained and processed electronic emitter data. The successful completion of this project resulted in a product which accomplishes the required tasks. The initial phase of the project was the requirements analysis. The technique used for this phase (Structured Analysis) proved to be only partially successful. It was only used at a very high level. For larger projects where more communication is necessary among designers and with users, it would be more beneficial. It was useful as a means of organizing the ideas of the designer, but the user/designer interaction was accomplished without the data flow diagrams. Familiarizing the user with the technique would be more productive on a larger project. The Structured Design technique used during the design specification stage was of greater value. It proved to be a very organized and effective method of taking a general task and breaking it into modules which could be easily coded and maintained. Even small software projects such as this can benefit from this or similar techniques. The choice of a programming language which encourages structured coding proved a wise decision. PASCAL is a highly readable language. While only an outside observer can determine how readable the resulting product is, the designer found debugging to be much simpler than expected. GRA

N80-28011# Sperry Univac, Roseville, Minn.
DATA BASE COMPUTER RESEARCH Final Report, 1 Sep. 1978 - 31 Aug. 1979
Harvey A. Freeman, J. Banerjee, R. B. Batman, O. H. Bray, H. R. Johnson, J. R. Jordan, J. L. Larson, T. M. P. Lee, D. B Russell, and T. B. Wilson 30 Nov. 1979 120 p refs
(Contract N00014-78-C-0487)
(AD-A082074; TMA-00789) Avail: NTIS HC A06/MF A01 CSCL 09/2

Data base computer research was undertaken by Sperry Univac to confirm the benefits of the DBC approach, and to determine the actual requirements of a data base computer from a computer manufacturer's point of view. Described in this report are an application investigation and analysis effort, a revised and extended data base computer design, the required software structure, a performance analysis, and some access control and security considerations. The result is a framework for a special purpose computer that will significantly improve the user's ability to manage the ever growing body of data characteristic of our modern technological society. GRA

N80-28012# Illinois Univ. at Urbana-Champaign. Coordinated Science Lab.
JETS: ACHIEVING COMPLETENESS THROUGH COVERAGE AND CLOSURE
Tim Finin, Bradley Goodman, and Harry Tennant 8 Feb. 1979 27 p refs
(Contract N00014-75-C-0612)
(AD-A081957; WP-19) Avail: NTIS HC A03/MF A01 CSCL 05/8

Work in progress on JETS, the successor to PLANES, is described. JETS is a natural language question answering system that is intended to interface users to a large relational data base. The architecture is designed to extend the conceptual coverage of JETS to better meet the conversational and data base usage requirements of users. The implementation of JETS is designed to gain a high degree of closure over concept manipulation, contributing to a solution to the problems of perspicuity and scale. Specific examples are given of concept manipulation through the implied relationships of modification and of an approach to problem-solving through the use of frames. GRA

N80-28057# Computer Corp. of America, Cambridge, Mass.
SPATIAL DATA MANAGEMENT SYSTEM Quarterly Research and Development Technical Report, 1 Sep. - 30 Nov. 1979

David Kramlich, Christopher F. Herot, Richard Carling, and Mark Friedell 30 Nov. 1979 38 p refs
(Contract MDA903-78-C-0122; APRA Order 3487)
(AD-A083729) Avail: NTIS HC A03/MF A01 CSCL 09/2

Work on the design and implementation of a prototype Spatial Data Management System (SDMS) is described. Spatial Data Management is a technique for storing and retrieving information which employs pictorial representations of data arranged on a collection of flat surfaces which the user can view on a color, raster scan display. Tools are provided for interactively entering graphical and symbolic data, including a mechanism for generating graphical representations of existing, shared symbolic data bases. Several new features that increase the utility of the system were implemented. These are: a new statement in the modified query language of the underlying DBMS; extensions to the graphical editor; extensions to the module which manages objects in the graphical Data Space (GDS); and a terminal emulator to provide a text interface to SDMS. GRA

N80-29048# Naval Postgraduate School, Monterey, Calif.
DATA BASE MANAGEMENT SYSTEM FOR MICROCOMPUTERS M.S. Thesis
Amrun Sehan and Timbul Maruap Sihombing Dec. 1979 113 p refs
(AD-A085036) Avail: NTIS HC A06/MF A01 CSCL 09/2

Many of the existing data base management systems have been developed for large applications such as big business. However other applications such as small businesses can also benefit from the managerial information which can be provided by a computer data base. This thesis develops a stand-alone data base management system using a microcomputer with floppy disk auxiliary storage and the UCSD PASCAL software package. This system has the capability to create, update, delete and insert information, and to respond to user inquiries. Because of the limited storage capacity and relatively slow access speeds of floppy disks, the system will only satisfy small applications. However, the advent of compatible hard disk systems for microcomputers will enable the system to be used for significantly larger applications. GRA

N80-30086# Maryland Univ., College Park. Dept. of Computer Science.
COMPUTER SCIENCE AND TECHNOLOGY: DATA ABSTRACTION, DATABASES, AND CONCEPTUAL MODELLING. AN ANNOTATED BIBLIOGRAPHY Final Report
Michael L. Brodie May 1980 91 p Sponsored by NBS
(PB80-183833; NBS-SP-500-59; LC-80-600052) Avail: NTIS HC A05/MF A01 CSCL 09B

A bibliography containing 350 entries on issues within the area of conceptual modelling of dynamic systems of complex data is given. The entries are from recent work in the areas of database management, programming languages, artificial intelligence, and software engineering. GRA

N80-31053# Naval Research Lab., Washington, D. C. Communications Sciences Div.
FUNCTIONAL DESIGN FOR AN AUTOMATED DATA BASE ERROR DETECTION SYSTEM Final Report
Gerald A. Wilson, Sandra B. Salazar, and Kathryn L. Heninger 15 May 1980 87 p refs
(XF21244103)
(AD-A086811; AD-E000448; NRL-MR-4223) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report documents the design proposed for an automated system for data base error detection. The system, called COPE, will be a front end to the data base management system to catch errors before they enter the data base. It will check for errors in each user's updates and prevent errors due to undesirable interactions between users. It should be invisible to the users during normal processing when an error is detected, it will operate interactively to inform the user and to request correction. GRA

N80-31086# Wisconsin Univ. - Madison. Mathematics Research Center.
DESIGN CONSIDERATIONS FOR DATA-FLOW DATABASE MACHINES
Haran Boral and David J. DeWitt Mar. 1980 38 p refs
(Contracts DAAG29-79-C-0185; DAAG29-75-C-0024; Grant NSF MCS-78-01721)
(AD-A086374; MRC-TSR-2058) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper presents a discussion of the application of data-flow machine concepts to the design and implementation of database machines which execute relational algebra queries. We analyze the performance of multiprocessor nested-loops and sort-merge join algorithms and show that the nested-loops algorithm is generally superior. Three levels of operand granularity for data-flow database machines are introduced and compared using the nested-loops join algorithm. We demonstrate that relation-level granularity is too coarse and that tuple-level granularity is too fine. The third level of granularity, a page of a relation, is shown to be the best choice from both hardware and software viewpoints. Finally a preliminary design for a data-flow database machine which utilizes page-level granularity and supports distributed control of instruction execution is presented. GRA

N80-32107 Polytechnic Inst. of New York.
DATA STRUCTURE INDEPENDENCE IN DATA BASE MANAGEMENT SYSTEMS Ph.D. Thesis
E. James Emerson 1980 224 p
Avail: Univ. Microfilms Order No. 8019396

The system that is proposed to achieve data structure independence includes three schemas: conceptual, physical and logical. The role of the conceptual schema is to represent the enterprise's data in such a way that the integrity of the data base is assured and data structure independence is achieved. To accomplish this a relational model of data with extensions to provide for integrity assertions was selected for the conceptual schema. The conceptual schema serves as the base from which both the logical and physical schemas are derived, thereby completely isolating one from the other. The physical schema has many similarities to a CODASYL data base. It contains owner to member sets and permits them to be combined to form networks. Additionally, it contains extensions such as secondary indexes, and could be augmented with additional facilities in the future. The logical schema has a single syntax used to define logical views for a CODASYL, Relational or IMS data model. The logical schemas are derived from the conceptual schema using four primitive mappings. It is demonstrated that these mappings are sufficient to generate the data structures required for the three models, and the structural mappings that are required to achieve data structure independence. Dissert. Abstr.

N80-32111# Massachusetts Inst. of Tech., Cambridge. Computer Science Lab.
PROGRAMS FOR DISTRIBUTED COMPUTING: THE CALENDAR APPLICATION
Irene Greif Jul. 1980 11 p refs
(Contract N00014-75-C-0661)
(AD-A087357; MIT/LCS/TM-166) Avail: NTIS HC A02/MF A01 CSCL 09/2

The calendar application involves a wide range of issues in distributed computing, from implementation of distributed data bases to design of a user interface that will enable the user to comprehend the complex distributed environment in which he is working. This memo summarizes current status of design and implementation of calendars. Sections 2 and 3 are taken from a progress report of March 1980 and section 4 is an update to that report including current status plans. We began our design of calendar systems with the intention of focussing on implementation issues, particularly those of communication, sharing of data, and the use of forms as the standard interface among modules. To assure variety in our implementation experience, we generated alternative designs of calendars. Implementations of several of them are now underway. During later design phases we became more interested in the functionality of the calendar and its user interface. To some extent the use of forms as the communication medium shapes the human interface as well as the process to process interface. Also, some aspects of the functionality, most notably the notion of (tentative meeting) have arisen from analysis of the distributed implementation. Section 2 is a report on the functionality of the calendars we are building. Section 3 is about the distributed implementation. GRA

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

A75-12153 # **Systems problems of telecommunication software (Systemove otazky telekomunikacniho programoveho vybaveni).** J. Horak. *Automatizace*, vol. 17, Sept. 1974, p. 230-234. 15 refs. In Czech.

Consideration of the role of telecommunication software in determining the effectiveness of a remote data-processing system. The basic properties of remote data-processing systems are reviewed, and the development of telecommunication software in systems with third-generation computers is described. Particular attention is paid to the new layer concept of telecommunication software in progressive systems bridging the transition to systems with fourth-generation computers. Telecommunication software layers are described within the framework of the new concept, which includes terminal control, network control, and data-link control. The requirements for transparencies in these layers are discussed, and some examples of queuing of telecommunication software layers in specific configurations of remote data-processing systems are presented. A.B.K.

A75-25798 * # **Development of a new computer system for aircraft noise prediction.** J. P. Raney (NASA, Langley Research Center, Aircraft Noise Prediction Office, Hampton, Va.). *American Institute of Aeronautics and Astronautics, Aero-Acoustics Conference, 2nd, Hampton, Va., Mar. 24-26, 1975, Paper 75-536.* 5 p. 5 refs.

The paper presents an overview of the activities of NASA's Aircraft Noise Prediction Office (ANOPO). The principal goal of ANOPO is to develop a comprehensive, user-oriented, Aircraft Noise Prediction Program (ANOPP). ANOPO's activities in support of ANOPP development are briefly discussed. They include acquisition, implementation, and evaluation of an in-house, interim collection of programs and implementation of a plan for acquiring, in the form of Key Technology Documents, state-of-the-art methodology for aircraft noise prediction. The paper is primarily devoted to a presentation of the general architecture and functional capability planned for ANOPP together with the rationale supporting major design decisions. (Author)

A76-42085 **$SHARE, the Space Shuttle Fleet Sizing Simulation Program.** A. T. Arcand (Aerospace Corp., El Segundo, Calif.). In: Summer Computer Simulation Conference, San Francisco, Calif., July 21-23, 1975, Proceedings. Volume 1.
Montvale, N.J., AFIPS Press, 1975, p. 496-507.

$SHARE is a General Purpose Simulation System Program devised to study the number of orbiters and the number of launch pads necessary to support the shuttle-based space program in the 1980s and 1990s. A review of program elements revealed many secondary influences. A methodology of organizing the underlying problem into a form suitable for parametric analyses and interpretation is developed. This approach uses controlled random number sequences to organize the problem into related test-sets. Each test run is evaluated using a multiple criteria evaluator to produce a single GO-NOGO identifier. A global management-oriented summary is formulated which allows multiple parameters tradeoffs to be readily visualized and compared. Expansion of the problem to additional variables provides results compatible with the existent data-base. Analysis of competing options is obtained as a differential effect. A family of compatible analysis programs supporting all aspects of resources allocation from design through operations is developed. S.D.

A77-21530 **Automated software engineering through structured data management.** C. A. Irvine and J. W. Brackett (SofTech, Inc., Waltham, Mass.). *IEEE Transactions on Software Engineering*, vol. SE-3, Jan. 1977, p. 34-40. 9 refs. Contract No. N62269-74-C-0790.

The paper describes the Software Engineering Facility (SEF), a system designed to aid in the development of well-engineered software. It is designed to run under and use existing operating systems and to provide a host-independent software development system. One of the chief considerations in the design of the system was that changes of goals and requirements can be handled with minimum cost. SEF embodies a unifying design strategy permitting development of simple tools that are broadly useful. It allows an evolutionary development strategy wherein one develops the most useful tools first and may spread the SEF development costs over many projects. A basic feature of the SEF is its facility to store, inspect, and manipulate modules, properties, and structure. The SEF processor extracts information on the structure (interdependencies) and properties of modules and makes it available to the software engineering database. P.T.H.

A77-37798 # **An integrated program and data management system for engineering applications.** A. J. Becqué. Delft, Technische Hogeschool, Doctor in de technische Wetenschappen Dissertation, 1977. 623 p. 73 refs.

Aspects of the LPR (List PRocessing) integrated programming and data base software system, a tool for developing computer programs and data bases for engineering purposes, are discussed. LPR subroutines used in programming create, lengthen, delete, or read from tables; analyze commands; produce trace output when debugging a program module of a subsystem; edit output. User profiles are examined. Preparation of input data using the 'data language' and the 'function language' is discussed, together with subsystem definition. The LPR subroutines available to the FORTRAN programmer are described. Examples of existing subprograms in the older LPR2 version are given. C.K.D.

A77-38843 **Applications of GIFTS III to structural engineering problems.** H. A. Kamel and M. W. McCabe (Arizona, University, Tucson, Ariz.). *(National Symposium on Computerized Structural Analysis and Design, 2nd, George Washington University, Washington, D.C., Mar. 29-31, 1976.) Computers and Structures*, vol. 7, June 1977, p. 399-415. 5 refs. U.S. Department of Transportation Contract No. CG-43-561-A; Contract No. N00014-67-A-0709-0016.

A description is presented of the newest version of the GIFTS system (Graphics Oriented Interactive Finite Element Package for Time-Sharing). The GIFTS III system considered is a collection of program modules operating on a standard Unified Data Base designed to facilitate the process of finite element analysis, using computer graphics in conjunction with time-sharing systems and/or minicomputers. The system capabilities include model generation and verification, the display of displacement and stress results, static analysis, analysis by substructures and constrained substructures, free vibration analysis, transient response analysis, and modal analysis. G.R.

A77-42046 **Artificial patterns.** A. Klinger (California, University, Los Angeles, Calif.). *IEEE Transactions on Software Engineering*, vol. SE-3, July 1977, p. 301-306. 23 refs. Grant No. AF-AFOSR-72-2384.

Computer generation of artificial patterns is addressed, with the object of obtaining varied but representative patterns for use in testing pattern recognition programs. Use of a modest set of natural patterns to build up a large data base of similar artificial patterns is demonstrated. Pattern data structures needed to form an artificial pattern are tentatively classified, and algorithms used are examined for possible inferences on the derivation of underlying physical realities from real observed patterns. Random insertions and deletions and random blurrings in patterns generated, different types of picture elements and the effect of their insertion, deletion, or retention on pattern recognition, and effects of other types of pattern distortion are investigated. R.D.V.

A78-15602 **Dip's and flatpacks come to software design.** G. G. Hays (Westinghouse Defense and Electronic Systems Center, Baltimore, Md.). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 410-415.

The paper describes a relatively new trend in software design towards fully data-base-driven software packages, where subroutines are used as multi-device packs. Using three examples - computer aided design, the Electronically Agile Radar Operational Software, and a compiler - it is shown how the 'calls' or uses are located into tables, and the benefits and inefficiencies of each representative area are discussed. B.J.

A78-16124 # **A 'Top-Down' approach to graphical presentation on Tektronix 4010 of data bases as a function of two variables (Un approccio 'Top-Down' alla presentazione grafica su Tektronix 4010 di biblioteche di dati in funzione di due variabili).** F. Bizzarri, P. De Vincenti, and S. Famularo (Selenia S.p.A., Rome, Italy). *Alta Frequenza*, vol. 46, Oct. 1977, p. 501-505. In Italian.

A78-16143 **Reduction of process congestion in front of critical regions by partial list locking (Reduzierung von Prozesstauungen vor kritischen Abschnitten mittels Teillistensperrung).** G. Lieflânder and G. Nees (Karlsruhe, Universität, Karlsruhe, West Germany). *Computing*, vol. 19, no. 2, 1977, p. 111-127. 15 refs. In German.

In processes executing in critical sections, it is proposed that only certain subsets of the list (common data base) be locked while the rest of the list remains accessible to further processes. This is accomplished by suitable synchronization operations, and leads to much improved output. Simulation results on partial list locking versus total list locking are presented. P.T.H.

A78-29883 # **The ASPROM automated microprogramming system (Avtomatizirovannaia sistema mikroprogrammirovaniia ASPROM).** S. S. Zabara, A. D. Mil'ner, E. V. Bobkova, G. I. Iesinetskii (Proektnoe Ob'edinenie Elektronmash, Kiev, Ukrainian SSR), and B. I. Kerzhenevich (Nauchno-Proizvodstvennoe Ob'edinenie Elva, Tiflis, Georgian SSR). *Upravliaiushchie Sistemy i Mashiny*, Nov.-Dec. 1977, p. 38-41. 8 refs. In Russian.

The ASPROM system was designed for the archiving, coding, analysis and documentation of microprograms. The present paper considers the general requirements that must be satisfied by an automated microprogramming system and then describes the ASPROM system with emphasis on the general organization of data base (languages, data structure and formats of input and output documents) and software. B.J.

A79-40351 **Hardware algorithms for nonnumeric computation.** A. Mukhopadhyay (Iowa, University, Iowa City, Iowa). *(Association for Computing Machinery and Institute of Electrical and Electronics Engineers, Annual Symposium on Computer Architecture, 5th, Palo Alto, Calif., Apr. 3-5, 1978.) IEEE Transactions on Computers*, vol. C-28, June 1979, p. 384-394. 53 refs. NSF Grant No. MCS-76-04763.

This paper is concerned with the design of hardware algorithms for nonnumeric computation. The subset of nonnumeric operations considered is derived from string processing languages such as Snobol or high-level database languages used in database management architectures. Being uniformly structured, the hardware could be implemented using LSI technology yielding an estimated pattern matching rate of about 100 million characters/s. The proposed nonnumeric processor will find applications in the environment of parallel (or associative) database management architectures, processing of large unstructured textual files, as a stand-alone microprocessor in digital communications which need simple search and update operations, or as a nonnumeric CPU that can be used along with the conventional CPU to expedite string processing operations. (Author)

A79-54411 # **Software project control - Yesterday's dream, tomorrow's reality.** J. W. Matejka and G. H. Sandler (Grumman Aerospace Corp., Bethpage, N.Y.). In: Computers in Aerospace Conference, 2nd, Los Angeles, Calif., October 22-24, 1979, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1979, p. 225-231. 6 refs. (AIAA 79-1960)

Various approaches to software management are described including the Performance Measurement System (PMS), Facility for Automated Software Production (FASP), and rate-charting techniques. The PMS is a closed loop system based on the major program management functions of organizing and planning the job in advance, authorizing and implementing the preplanned tasks, accounting for and measuring the work completed to date, analyzing variances from the plan, and taking corrective action as necessary. The FASP is a comprehensive software generation facility consisting of an integrated collection of software development and maintenance tools. The rate-chart technique displaying a graphic representation of status and rate of progress in two dimensions, can be applied to the four basic phases of software development: design, coding, stand-alone testing, and integration testing. V.T.

A79-54422 # **Software changes for a high-technology test program.** A. G. Mona (McDonnell Douglas Astronautics Co., Huntington Beach, Calif.). In: Computers in Aerospace Conference, 2nd, Los Angeles, Calif., October 22-24, 1979, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1979, p. 326-329. Grant No. DAHC60-72-C-0080. (AIAA 79-1984)

This paper presents the results of an investigation of software failures encountered in the test phase of the Terminal Defense-Technology Validation Program conducted by the US Army Ballistic Missile Defense Command. The large data base involved confers to the results a degree of statistical significance which makes them useful for planning similar efforts in the future. Program specifics are therefore given to the extent necessary to allow a meaningful use of the results. (Author)

A80-30007 **Self-learning data-base for automated fault localization.** B. B. Dunning (Sperry Rand Corp., Sperry Univac Div., Eagan, Minn.). In: AUTOTESTCON '79; Proceedings of the International Automatic Testing Conference, Minneapolis, Minn., September 19-21, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 155-157.

This paper presents information concerning a data-base being developed at Sperry Univac for use with general purpose automatic test equipment. This fault isolation data-base incorporates self-learning characteristics such that new fault isolation information (including real world) are added to the data-base. In addition, a closest matching algorithm is discussed which has been found to provide an increase of 14% in fault isolation accuracy over isolation without closest matching. (Author)

A80-30017 # **Development of building block software for the automatic calibration of precision measurement equipment.** E. A. VanEtten (USAF, Aerospace Guidance and Metrology Center, Newark Air Force Station, Ohio). In: AUTOTESTCON '79; Proceedings of the International Automatic Testing Conference, Minneapolis, Minn., September 19-21, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 247-249.

The software development technique described permits the automatic calibration of Precision Measurement Equipment (PME) according to equipment type or class instead of individual part number. By applying this technique, hundreds of different PME may be calibrated by a few carefully created calibration programs. Each procedure is designed to calibrate a particular class of equipment, such that when executed the procedures configure themselves to the unique PME being calibrated. Configuration information is read from a data file that uniquely describes the device under test. (Author)

A80-34183 **Integration of development tools to achieve reliability and productivity.** E. L. Brill (Battelle Columbus Laboratories, Columbus, Ohio). In: Military Electronics Defence Expo '79; Proceedings of the Conference, Wiesbaden, West Germany, September 25-27, 1979. Cointrin, Geneva, Switzerland, Interavia, S.A., 1979, p. 717-739. Research supported by Battelle Memorial Institute; U.S. Department of Transportation Contract No. CG-64822-A.

The design for an automated construction of transaction system (ACTS) software for better on-line forms processing is analyzed. The system centers around a meta-language developed for programming transaction process functions and includes a software generator (that produces executable source code), a comprehensive Data Element Dictionary (DED), a commercial Data Base Management System (DBMS), and extensive capabilities to capture system documentation. As a software generator, ACTS produces ANSI FORTRAN source code which is compatible with most computers. The use of the ACTS system has shown that the time requirement has been reduced to a few days to conceive and carry through its implementation noting the reliability of the resultant software which reduces the need for maintenance and checkout. O.L.

A80-40327 **Data needs for software reliability modelling.** L. Duvall, J. Martens (IIT Research Institute, Rome, N.Y.), D. Swearingen, and J. Donahoo (Computer Sciences Corp., Huntsville, Ala.). In: Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 200-208. 31 refs.

This paper summarizes the results of a study to determine the data requirements for software reliability modeling. The major assumptions of the models are presented along with a brief description of their uses and the data needed to exercise the models. Methodologies for evaluating failure databases are presented including a sample evaluation to determine the adequacy of the data to do comparisons across a wide variety of projects and to determine if the database contains data elements as required by the various models. (Author)

N75-10721*# **Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.**
A COMMUNICATION LINK BETWEEN THE GIM DATA BASE AND A GENERAL APPLICATION PROGRAM
W. V. Argo Jun. 1972 5 p
(Contract NAS9-12200)
(NASA-CR-140304; LEC-TM-642-508) Avail: NTIS HC $3.25 CSCL 09B

Utilizing the extract verb of GIM causes the requested information to be extracted from the GIM base and written on to tape. When the GIM extract has completed, a FORTRAN program is then compiled and executed. This program reads the tape generated by GIM, formats and prints the extracted data on the line printer. When an end of file on the extracted tape is encountered the job is terminated. Author

N75-15336# RAND Corp., Santa Monica, Calif.
EXPERIENCES IN DESIGNING A DATA RETRIEVAL CAPABILITY FOR A LARGE DATA BASE
L. H. Heiser Apr. 1974 15 p refs
(AD-786712; P-5113) Avail: NTIS CSCL 09/2

DATAR is a package of subroutines that provide data retrieval capabilities for a large weather data base. The design of this package was a valuable learning experience for the author. Questions of portability had to be resolved since the package must run on several different computers. Questions of interface arose since DATAR would be imbedded in other programs. Also, it was desirable to have changes to the subroutines be transparent to the user. And the list goes on. It is the author's intent to discuss the design of DATAR and to share the learning experiences. Author (GRA)

N75-17119*# Aerophysics Research Corp., Houston Tex.
THE ENGINEERING DESIGN INTEGRATION (EDIN) SYSTEM
C. R. Glatt, G. N. Hirsch, G. E. Alford, W. N. Colquitt, and S. J. Reiners Dec. 1974 239 p refs
(Contract NAS9-13584)
(NASA-CR-141598; JTN-11) Avail: NTIS HC $7.50 CSCL 09B

A digital computer program complex for the evaluation of aerospace vehicle preliminary designs is described. The system consists of a Univac 1100 series computer and peripherals using the Exec 8 operating system, a set of demand access terminals of the alphanumeric and graphics types, and a library of independent computer programs. Modification of the partial run streams, data base maintenance and construction, and control of program sequencing are provided by a data manipulation program called the DLG processor. The executive control of library program execution is performed by the Univac Exec 8 operating system through a user established run stream. A combination of demand and batch operations is employed in the evaluation of preliminary designs. Applications accomplished with the EDIN system are described. Author

N75-17120*# Aerophysics Research Corp., Houston Tex.
GEOMETRY TECHNOLOGY MODULE (GTM). VOLUME 1: ENGINEERING DESCRIPTION AND UTILIZATION MANUAL Final Report
S. J. Reiners, G. N. Hirsch, G. E. Alford, and C. R. Glatt Dec. 1974 113 p refs 2 Vol.
(Contract NAS9-13584)
(NASA-CR-141594; JTN-09-Vol-1) Avail: NTIS HC$5.25 CSCL 09B

The geometry technology module (GTM) is described as a system of computerized elements residing in the engineering design integration system library developed for the generation, manipulation, display, computation of mass properties, and data base management of paneled geometry. The GTM is composed of computer programs and associated data for performing configuration analysis on geometric shapes. The program can be operated in batch or demand mode and is designed for interactive use. Author

N75-17121*# Aerophysics Research Corp., Houston Tex.
GEOMETRY TECHNOLOGY MODULE (GTM). VOLUME 2: PROGRAMMERS' MANUAL Final Report, Jun. 1973 - Dec. 1974
S. J. Reiners, G. N. Hirsch, W. N. Colquitt, G. E. Alford, and C. R. Glatt Dec. 1974 123 p ref 2 Vol.
(Contract NAS9-13584)
(NASA-CR-141595; JTN-09-Vol-2) Avail: NTIS HC$5.25 CSCL 09B

For abstract, see N75-17120.

N75-17122*# Aerophysics Research Corp., Houston Tex.
THE DLG PROCESSOR: A DATA MANAGEMENT EXECUTIVE FOR THE ENGINEERING DESIGN INTEGRATION (EDIN) SYSTEM. VOLUME 1: ENGINEERING DESCRIPTION AND UTILIZATION MANUAL Final Report, Jun. 1973 - Dec. 1974
C. R. Glatt and W. N. Colquitt Dec. 1974 36 p ref
(Contract NAS9-13584)
(NASA-CR-141596; JTN-10-Vol-1) HC $3.75 CSCL 09B

The DLG processor is a Univac 1100 series computer program designed to read, modify, manipulate, and replace symbolic images. DLG is controlled by a set of user supplied directives and operates from a data base of stratified information which can be merged with the symbolic images. Data bases can be constructed and maintained in the mass storage media using the DLG directive language. Author

N75-17123*# Aerophysics Research Corp., Houston Tex.
THE DLG PROCESSOR: A DATA MANAGEMENT EXECUTIVE FOR THE ENGINEERING DESIGN INTEGRATION (EDIN) SYSTEM. VOLUME 2: PROGRAMMERS' MANUAL Final Report, Jun. 1973 - Dec. 1974
C. R. Glatt and W. N. Colquitt Dec. 1974 165 p
(Contract NAS9-13584)
(NASA-CR-141597; JTN-10-Vol-2) Avail: NTIS HC$6.25 CSCL 09B

For abstract, see N75-17122.

N75-17128# Knolls Atomic Power Lab., Schenectady, N.Y.
DATATRAN 2 IMPLEMENTATION
H. J. Kopp, W. E. Schilling, D. S. Selengut, R. G. Stieglitz, K. L. Henewalt, and J. J. Urbaniak Oct. 1974 198 p refs
(Contract W-31-109-eng-52)
(KAPL-M-7388) Avail: NTIS HC $7.00

Datatran 2 is a non-interactive data base management language that is used as the environment for a modular computer program network. This manual describes the programming used to implement the language on CDC-6600 and CDC-7600 equipment. It is intended to serve as a maintenance document at the Bettis Atomic Power Laboratory and KAPL as well as a guide for installation on other computers. More than 80 percent of the programming is in FORTRAN IV. Author (NSA)

N75-18827# Stanford Research Inst., Menlo Park, Calif.
EXTRACTION OF ALERT FUNCTIONS BY INDUCTIVE INFERENCE ON HISTORICAL DATA
Abraham Waksman Oct. 1974 65 p refs
(Contract N00014-71-C-0210; SRI Proj. 1031)
(AD-A001006; SRI-1031-TR-10) Avail: NTIS CSCL 09/2

This report describes a partial implementation of a system concept for retrospective analysis of historical data to discover alert and alarm indicators. Such a system can become an important component in a larger system for administration aid and monitoring where historical data plays an important part. The system described is a knowledge-base system where data-source knowledge is represented in the form of rule-functions participating in the systems decision mechanism. (Modified author abstract) GRA

N75-20011*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.
DETAILED REQUIREMENTS DOCUMENT FOR COMMON SOFTWARE OF SHUTTLE PROGRAM INFORMATION MANAGEMENT SYSTEM
J. M. Everette, L. D. Bradfield, and C. L. Horton Feb. 1975 67 p refs
(Contract NAS9-12200)
(NASA-CR-141709; LEC-5479; JSC-09380) Avail: NTIS HC $4.25 CSCL 09B

Common software was investigated as a method for minimizing development and maintenance cost of the shuttle program information management system (SPIMS) applications while reducing the time-frame of their development. Those requirements satisfying these criteria are presented along with the stand-alone modules which may be used directly by applications. The SPIMS applications operating on the CYBER 74 computer, are specialized information management systems which use System 2000 as a data base manager. Common software provides the features to support user interactions on a CRT terminal using form input and command response capabilities. These features are available as subroutines to the applications. Author

N75-21042*# Universities Space Research Association, Charlottesville, Va. Inst. for Computer Applications in Science and Engineering.
ACCESSING TECHNICAL DATA BASES USING STDS: A COLLECTION OF SCENARIOS
W. T. Hardgrave 16 Apr. 1975 85 p refs
(Grants NGR-47-102-001; NsG-1068)
(NASA-CR-142589; ICASE-75-8) Avail: NTIS HC $4.75 CSCL 09B

A line by line description is given of sessions using the set-theoretic data system (STDS) to interact with technical data bases. The data bases contain data from actual applications at NASA Langley Research Center. The report is meant to be a tutorial document that accompanies set processing in a network environment. Author

N75-21043# Avcon Universal Consultants Corp., Baden, Pa.
UTILIZING FACILITIES MASTER FILE DATA FOR MICROWAVE LANDING SYSTEM IMPLEMENTATION Final Report
Thomas L. Croswell Oct. 1974 31 p refs
(Contract DOT-FR-WI75-5025-1)
(AD-A002818; AV-MLS-74-3; FAA-RD-74-183) Avail: NTIS HC $3.75

The development is described of specialized computer programs to incorporate data from the airway facilities master file (FMF) and their applications to microwave landing system (MLS) implementation planning. The objectives of the study, descriptions of the FMF, listings of the programs developed, and examples of the MLS applications of the annual listings of commissioned instrument landing system (ILS) facilities derived from the FMF data are included. Author

N75-29828# Army Engineer Topographic Labs., Fort Belvoir, Va.
A SYSTEM FOR TOPOGRAPHIC INQUIRY NO. 2 ALPHANUMERIC SUBSYSTEM Final Report, Jul. 1970 - Jul. 1974
Alden Corell Gunther Mar. 1975 104 p refs
(DNA Proj. 4304)
(AD-A008012; ETL-0003) Avail: NTIS CSCL 08/2

The System for Topographic Inquiry (STOPIN)--Alphanumeric Subsystem is an on-line, topographic data system developed to demonstrate the capability to store, retrieve, and disseminate large quantities of non-graphic topographic information. This report describes the assumptions and design criteria employed during the development, outlines the software package developed to implement the data base, and provides a description of each data field including the allowable requests for information. GRA

N75-32788 Florida Univ., Gainesville.
A CELLULAR SYSTEM FOR NON-NUMERIC PROCESSING Ph.D. Thesis
George Prentice Copeland, Jr. 1974 184 p
Avail: Univ. Microfilms Order No. 75-19321

The top-down design of a combined software and hardware system for non-numeric processing was investigated, with emphasis on data base management. The requirements for a generalized data base management system were first reviewed, from which a suitable language was selected for the structural description and manipulation of data. The system requirements, the data language, and cost considerations of present and projected technologies are then used as premises from which a hardware structure and instruction set are derived. The derived hardware structure is a one-dimensional array of identical cells, with the additional features of modular expansion of capacity, a greater degree of independence between response time and data base size, and greater freedom in matching the hardware system to the cost and response time trade offs of different user environments. The software and hardware complexity and cost are greatly reduced compared to conventional systems. Dissert. Abstr.

N76-18816# Ohio State Univ., Columbus. Computer and Information Science Research Center.
DATA BASE MODULE VERIFICATION: A CERTIFICATION METHOD FOR DATA SECURE SYSTEMS
William A. Hoyger, Jr. Jun. 1975 135 p refs
(Contract N00014-75-C-0573)
(AD-A014614; OSU-CISRC-TR-75-3) Avail: NTIS CSCL 09/2

The verification technique used is the inductive assertion method. The verification is discussed of programs operating on a complex data structure called the generalized file organization. As part of this investigation, additional complex data structures are introduced which will be manipulated by the programs. If these manipulations are properly performed, the correctness of the programs is guaranteed. These additional data structures are defined and examples of their use are given so that no further definitional work on the structures is necessary. Author (GRA)

N76-18818 Oklahoma State Univ., Stillwater.
LANGUAGES FOR SPECIFYING PROTECTION REQUIREMENTS IN DATA BASE SYSTEMS: A SEMANTIC MODEL Ph.D. Thesis

H. Rex Hartson 1975 246 p
Avail: Univ. Microfilms Order No. 76-3444

A model of access control was developed to provide a semantic base for constructs of protection languages at many levels of sophistication, accommodating a wide range of protection policies. The concept of ownership is used for validation of authorizations in the model. Various ownership policies, such as group ownership, subownership, and conditional ownership can be represented. The basic sets of the model are presented and the set of system states is derived from the set of all values of the resources. Subsets of states are defined by restrictions on resource values, described by Boolean expressions known as conditions. The most important use of conditions is as access conditions, which allow each access decision to depend on information related to the user, to resources, to data content, to access history, and to the general state of the system. A GENERAL class of users is defined to establish an overall minimum level of access rights without an explicit representation for each and every user. Dissert. Abstr.

N76-18829# Value Engineering Co., West Long Branch, N.J.
MIRACODE TRANSPORTATION PROGRAM Final Report
John H. Waite (Cryptanalytic Computer Sci., Inc.), Sheldon Epstein (Cryptanalytic Computer Sci., Inc.), and Otto Koudelka (Picatinny Arsenal) Sep. 1975 48 p
(Contract DAAK02-73-D-0045; DA Proj. 1E8-65803-M-728)
(AD-A014990; PA-TR-4757) Avail: NTIS CSCL 14/5

This report discusses a computer software package that has been developed by the EDS and R Project for preparing a standard binary coded microfilm for input to a wide variety of computer output microfilm (COM) devices. This software package is currently being tested at Picatinny Arsenal on two different data base applications prior to being released to other Army installations. Author (GRA)

N76-20863*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
NONDETERMINISTIC DATA BASE FOR COMPUTERIZED VISUAL PERCEPTION
Y. Yakimovsky 1 Feb. 1976 23 p refs
(Contract NAS7-100)
(NASA-CR-146578; JPL-TM-33-761) Avail: NTIS HC $3.50 CSCL 09B

A description is given of the knowledge representation data base in the perception subsystem of the Mars robot vehicle prototype. Two types of information are stored. The first is generic information that represents general rules that are conformed to by structures in the expected environments. The second kind of information is a specific description of a structure, i.e., the properties and relations of objects in the specific case being analyzed. The generic knowledge is represented so that it can be applied to extract and infer the description of specific structures. The generic model of the rules is substantially a Bayesian representation of the statistics of the environment, which means it is geared to representation of nondeterministic rules relating properties of, and relations between, objects. The description of a specific structure is also nondeterministic in the sense that all properties and relations may take a range of values with an associated probability distribution. Author

N76-21946# IBM Federal Systems Div., Cape Canaveral, Fla.
DESIGN OF TRAINING SYSTEMS: PROGRAM MAINTENANCE MANUAL DATA BASE, ETE, SCRR, AND TPF MODELS. FOCUS ON THE TRAINED MAN
Harold J. Bellamy, Kenneth V. Branch, James D. Staley, and Ronald E. Yanko Sep. 1975 618 p refs
(Contract N61339-73-C-0097)
(AD-A018089; TAEG-28) Avail: NTIS CSCL 05/9

The report contains detailed information on the three Design of Training Systems (DOTS) models and the DOTS data base. It consists of a single volume containing a description and macro flow, detailed logic flows and program listings for the Educational Technology Evaluation model (ETE), the System Capabilities Requirements and Resources (SCRR) model, the Training Process Flow (TPF) model and the DOTS data base. Control logic, input/output record formats, and temporary and permanent data files are described for each subsystem (the three models and the data base). The information contained in this volume is intended for use by programmers tasked with installing or modifying the DOTS programs. GRA

N76-21948# IBM Federal Systems Div., Cape Canaveral, Fla.
DESIGN OF TRAINING SYSTEMS, USER'S MANUAL, DATA BASE, ETE, SCRR, AND TPF MODELS
Harold J. Bellamy, Kenneth V. Branch, James D. Staley, and Ronald E. Yanko Sep. 1975 315 p refs
(Contract N61339-73-C-0097)
(AD-A018012; TAEG-30) Avail: NTIS CSCL 05/9

The purpose of this User's Manual is to familiarize the non-ADP user of the Design of Training Systems (DOTS) programs with the operation of the three DOTS models and the DOTS data base. It is concerned with methods for using the DOTS programs without detailed treatment of the design rationale or specified programming techniques employed in developing the models and the data base. The design of the system components is covered in detail in Volumes I and II of TAEG Report 12-2, 'Design of Training Systems Phase II Report.' Detailed programming information is contained in TAEG Report No. 29, 'The Design of Training Systems Program Maintenance Manual.' This manual is organized in four major sections covering the DOTS data base, the Educational Technology Evaluation (ETE) model, the System Capabilities Requirements and Resources (SCRR) model and the Training Process Flow (TPF) model respectively. The sections dealing with the models are all organized similarly and include subsections on model architecture, operational procedures and operational test. The model architecture section describes the model for the user in terms of model functions, significant design assumptions, input data requirements and output data descriptions. Operational procedures are covered as they relate specifically to the individual models and contain the steps necessary to apply the models to appropriate problems. Operational tests are specified to the extent necessary to assess system functional integrity but do not cover tests to determine the validity of the system in specific applications. GRA

N76-23864*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
DABI: A DATA BASE FOR IMAGE ANALYSIS WITH NONDETERMINISTIC INFERENCE CAPABILITY
Y. Yakimovsky and R. Cunningham 15 May 1976 48 p refs
(Contract NAS7-100)
(NASA-CR-147944; JPL-TM-33-773) Avail: NTIS HC $4.00 CSCL 09B

A description is given of the data base used in the perception subsystem of the Mars robot vehicle prototype being implemented at the Jet Propulsion Laboratory. This data base contains two types of information. The first is generic (uninstantiated, abstract) information that specifies the general rules of perception of objects in the expected environments. The second kind of information is a specific (instantiated) description of a structure, i.e., the properties and relations of objects in the specific case being analyzed. The generic knowledge can be used by the approximate reasoning subsystem to obtain information on the specific structures which is not directly measurable by the sensory instruments. Raw measurements are input either from the sensory instruments or a human operator using a CRT or a TTY. Author

N76-23900# Army Engineer Topographic Labs., Fort Belvoir, Va.
A SYSTEM FOR TOPOGRAPHIC INQUIRY. NO. 5.2 ALPHANUMERIC SUBSYSTEM USERS GUIDE Final Report
Alden C. Gunther Nov. 1975 63 p refs
(AD-A018531; ETL-0031) Avail: NTIS CSCL 08/2

The System for Topographic Inquiry (STOPIN) Alphanumeric Subsystem is an on-line, topographic data system developed to demonstrate the capability to store, retrieve, and disseminate large quantities of nongraphic topographic information. This report explains the language used and the methods employed by the software and provides a guide for using the interactive and batch commands of STOPIN. GRA

N76-23901# System Development Corp., Santa Monica, Calif.
CODS USER GUIDE Special Technical Report, Sep. 1974 - Sep. 1975
K. M. Brandon 14 Nov. 1975 18 p refs
(Contract DAHC15-73-C-0080)
(AD-A018345; SDC-TM-5800/000/00) Avail: NTIS CSCL 09/2

This document describes the use of the Conversion of Data Structures (CODS) system, which can convert and transfer data bases to and from disparate data management systems, using translation languages and the query and generate functions of the data management systems. The system is a research prototype that has been demonstrated and tested. Author (GRA)

N76-24837# Ohio State Univ. Research Foundation, Columbus. Computer and Information Science Research Center.
LANGUAGES FOR SPECIFYING PROTECTION REQUIREMENTS IN DATA BASE SYSTEMS: A SEMANTIC MODEL
H. Rex Hartson Aug. 1975 249 p refs
(Contract N00014-75-C-0573)
(AD-A018284; OSU-CISRC-TR-75-6) Avail: NTIS CSCL 09/2

This dissertation develops a model of access control to provide a semantic base for constructs of protection languages at many levels of sophistication, accommodating a wide range of protection policies. The concept of ownership is used for validation of authorizations in the model. Various ownership policies, such as group ownership, subownership, and conditional ownership can be represented. The basic sets of the model are presented and the set of system states is derived from the set of all values of the resources. GRA

N76-24944# Army Construction Engineering Research Lab., Champaign, Ill.
USERS MANUAL FOR THE AUTOMATED MILITARY CONSTRUCTION PROGRESS REPORTING SYSTEM (AMPRS) Final Report
W. G. Guier, J. E. Fitzpatrick, E. A. Rood, R. Skarseth, and C. J. LeBlanc Nov. 1975 252 p
(AD-A018716; CERL-TR-P-47) Avail: NTIS CSCL 09/2

This users manual presents procedures for acquiring and coding updated information for the Automated Military Construction Progress Reporting System (AMPRS). It is aimed at operations personnel in engineering, construction, and real estate who perform the acquisition and coding functions. This manual is one of five providing information and instructions for AMPRS. The other four manuals are: Executive summary for the Conversion Instruction for the AMPRS, ADP Manual for the AMPRS, Reference Manual for the AMPRS, and Conversion Instructions for the AMPRS. Author (GRA)

N76-24947# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
DISTRIBUTED COMPUTATION AND TENEX-RELATED ACTIVITIES Quarterly Progress Report, 1 Aug. - 30 Oct. 1975
J. Burchfiel, R. Thomas, T. Myer, and R. Tomlinson Nov. 1975 40 p
(Contract N00014-75-C-0773; ARPA Order 2901)
(AD-A018660; BBN-3210; QPR-4) Avail: NTIS CSCL 09/2

The report describes continuing refinement of the TENEX RXEXEC distributed file system which supports geography-independent computing on a number of ARPANET TENEX sites. It describes BBN efforts to integrate TENEX into the National Software Works system. It also describes BBN efforts to upgrade existing ARPANET message service to meet NAVY requirements for an interactive message processing test at CINCPAC. Author (GRA)

N76-25850# Army Missile Research, Development and Engineering Lab., Redstone Arsenal, Ala. Guidance and Control Directorate.
UTILIZATION OF COMMON SUBROUTINE AND FUNCTION SUBPROGRAMS IN MISSILE SYSTEM SIMULATIONS
Karmon Isom and Larry Hazel 6 Nov. 1975 36 p refs
(DA Proj. 1X3-63309-D-073)
(AD-A018870; RG-76-28) Avail: NTIS CSCL 09/2

The requirements for the integration of differential equations and function generation are common to all weapon (missile) system flight path (trajectory) simulation programs. Subroutine subprograms and function subprograms to perform these requirements have been provided as routines on a user library for the Xerox Sigma 5 Analog Coupler Driver Simulation Facility. A detailed description and the call statements for these user library subprogram subroutines are contained within this report. Examples depicting the subprogram useage along with the results obtained are also given. Heretofore, these subprogram subroutines and functions have been included in source form with the main program when submitted to the Xerox Sigma 5 Simulation Facility for compiling, loading, and executing. GRA

N76-26880 Texas A&M Univ., College Station.
A HIGH LEVEL LANGUAGE IMPLEMENTATION OF THE COMMON FEATURES OF DATA BASE DEFINITIONS Ph.D. Thesis
Jimmie Charles Rhea Forehand 1975 122 p
Avail: Univ. Microfilms Order No. 76-12666

A high level language (GDBD - Generalized Data Base Definition) is presented for hierarchical relationships, network relationships, and data field definitions which, with a proper translator, can be used to generate data base definitions. The hierarchical relationships are specified by the production notation of formal languages. A notation for the many-to-one feature of network relationships was specified which follows the hierarchical path of the many, and points to the one. The data field definitions are defined as named n-tuples where the name relates the data field to the hierarchical definition and positional parameters define the specific features of the data field. To test the GDBD language three test data bases were designed. Hierarchical relationships and data field definitions for each of the three data bases are presented. Dissert. Abstr.

N76-27907# California Univ., Berkeley. Lawrence Berkeley Lab.
KEYWORD ACCESS TO A MASS STORAGE DEVICE AT THE RECORD LEVEL
Guy F. Mantai 12 Sep. 1975 18 p refs Presented at Intern. Conf. on Very Large Data Bases, Boston, Mass., 22 Sep. 1975
(Contract W-7405-eng-48)
(LBL-4256; Conf-750969) Avail: NTIS HC $4.00

A general software package was built to access individual data records stored on an IBM-1360 photo-digital mass storage device with a current on-line capacity of 50 billion characters (bytes) and an infinitely extensible off-line capacity. An existing data base management system was used to maintain the pointers to the data on the mass storage device and to store the controls for the data driven interactive code. Existing data dictionaries used for sequentially processing the data bases were stored in the DBMS and used to display individual data items within the retrieved records. Data retrieved from the mass storage device is displayed interactively or sent for further processing to various report generation and statistics packages. The system provides dial-up terminal retrieval capability for exceedingly large socio-economic and demographic data bases used by national and regional planning agencies of the federal government. Author (ERA)

N76-29332* Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
AN MBASIC APPLICATION PROGRAM FOR RELATIONAL INQUIRIES ON A DATA BASE
R. M. Smith *In its* The Deep Space Network 15 Aug. 1976 p 100-107 refs
CSCL 09B

An MBASIC application program is described that allows a user to specify and use a sequence of relational operations on a relational data base for the purpose of making an inquiry or for the purpose of transferring data to a new file. Author

N76-29967# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
ANALYSIS OF DEADLOCK AVOIDANCE SCHEMES AND RESOURCE UTILIZATION FOR NON-PREEMPTIBLE RESOURCES

Hsau-Chung Chang 20 Jun. 1975 235 p refs
(Contract F44620-73-C-0074)
(AD-A021732; AFOSR-75-1674TR) Avail: NTIS CSCL 09/2

Two aspects of the performance of deadlock avoidance schemes are studied. The first is the cost of deadlock avoidance algorithms. This represents the system overhead. The second is the resource utilization under different schemes. For the first, the basic cost is the computation of the Boolean function safe(I), where I is an integer vector representing the system state. SAFE(I) is true if the system is safe, false otherwise. The resource allocator will make the allocation only when the resulting system has safe(I) = true. Based on the concept of computation trees, several lower bounds for the cost involved in computing safe(I) are established under different conditions. An upper bound is also developed. GRA

N76-30887# Boeing Aerospace Co., Seattle, Wash.
USERS MANUAL FOR SUPERSAP2 Final Report
J. L. Cooke, J. J. Schwartz, D. E. Duncan, and L. H. Skinner Kirtland AFB, New Mex. AFWL Feb. 1976 208 p refs
Prepared in cooperation with BDM Corp., Albuquerque, New Mex.
(Contract F29601-74-C-0008; AF Proj. 3763)
(AD-A022979; D224-13047-2; BDM/A-120-74-TRR1; AFWL-TR-75-70) Avail: NTIS CSCL 09/2

This report presents user information for the computer code SUPERSAP2. SUPERSAP2 is a data storage and retrieval program. It is designed to manipulate data from two large data bases in support of EMP susceptibility threshold analysis. The Component Data Base contains data on approximately 88,000 electronic component types. The System Description Data Base is user defined. SUPERSAP2 uses a command language to provide user control of a variety of data manipulations. Author (GRA)

N76-32888# California Univ., Livermore. Lawrence Livermore Lab.
CONCORD: A WORD INDEX GENERATOR FOR ARBITRARY TEXT STRINGS
J. E. Remus 23 Nov. 1975 17 p refs
(UCID-30128) Avail: NTIS HC $3.50

The CONCORD computer program which creates a concordance for arbitrary text strings is described. These alphabetically ordered word indexes are used as lookup tables for bibliographic, administrative, or scientific information and data. The program selects essential terms from the input text according to an algorithm using user-specified ACCEPT or REJECT lists. The program contains options for printing the index terms on either the left or right side of the page to facilitate visual lookup on microfiche or on single-page computer-printed output. Large files containing 50,000 references are produced in about 10 minutes of CDC 7600 computer time. Author (ERA)

N76-32892# Michigan Univ., Ann Arbor. Graduate School of Business Administration.
APPLICABILITY OF MICROPROGRAMMING TO THE TRANSLATION OF DATA AND DATA BASE MANAGEMENT SYSTEMS
David J. DeWitt Jun. 1975 16 p refs
(Contract DCA100-72-C-0018; ORA Proj. 011067)
(AD-A023614; Working-Paper-902) Avail: NTIS CSCL 09/2

This paper continues the development of data base management system migration methodology by investigating the role of microprogramming. While this research is basic to achieving behavioral equivalence of computing system hardware, it has further application towards achieving language compatibility and the development of data translators. GRA

N77-11720# Oak Ridge National Lab., Tenn.
ADINDEX: A PL/1 PROGRAM THAT PRODUCES SIMPLE OR STRUCTURED INDEXES FROM ADSEP DATA BASES
F. D. Hammerling and J. L. McNeany Apr. 1976 40 p refs
(Contract W-7405-eng-26)
(ORNL-CSD-TM-1) Avail: NTIS HC A03/MF A01

ADINDEX is a PL/1 program that produces simple or up-to-three-level structured indexes on any combination of fields from ADSEP data bases in a multiple column format, defined by input parameters, suitable for publication with bibliographies. The program will also produce a term frequency count, i.e., a list of terms and the number of times they occur in the data base. This program forms part of the ORCHIS Information System. ERA

N77-11727# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
SOME DATA-BASE APPLICATIONS OF CONSTRAINT EXPRESSIONS M.S. Thesis
R. W. Grossman Feb. 1976 160 p refs
(Contracts N00014-75-C-0661; N00014-75-C-0643)
(AD-A024149; TR-158) Avail: NTIS HC A08/MF A01 CSCL 09/2

This report presents a novel network-like representation for information, called 'constraint expressions' (CE). CE makes use of some of the knowledge-representation techniques developed by Artificial Intelligence research. A CE network consists of points (which represent classes of objects) interconnected by constraints (which represent the relationships which are known to hold among the classes). All constraints are defined in terms of six primitive ones. The data in a CE network is accessed by propagating various kinds of labels through it. Each constraint can be viewed as an active process which looks for certain patterns of labels on some of its attached points, and then propagates new labels to other points when such patterns occur. GRA

N77-11731# California Inst. of Tech., Pasadena.
PRACTICAL NATURAL LANGUAGE PROCESSING. THE REL SYSTEM AS PROTOTYPE
Frederick B. Thompson and Bozena Henisz Dostert Griffiss AFB, N. Y. RADC Mar. 1976 80 p refs
(Contract F30602-72-C-0249; AF Proj. 4594)
(AD-A024313; RADC-TR-76-77) Avail: NTIS HC A05/MF A01 CSCL 09/2

REL is a prototype data analysis system that allows complex data analysis to be carried out in response to straight-forward statements in technical English. Data input is handled by bulk data input routines that accept data in customary forms from cards or unit record data sets. Once the data base has been built, the researcher can apply the statistical analyses he desired through English queries. Author (GRA)

N77-12744 Massachusetts Univ., Amherst.
THE USE OF CONTEXT IN CHARACTER RECOGNITION Ph.D. Thesis
Edward George Fisher 1976 186 p
Avail: Univ. Microfilms Order No. 76-22259

Improvements to binary n-gram algorithms are proposed which facilitate the use of different types of n-grams for a collection of words of varying lengths. Algorithms which utilize this extended data base for the detection, location, and correction of insertion, deletion, split, and merger errors are presented. A primary feature of the new algorithms is that the n-grams are anchored to one or both ends of the word. Experiments are performed which show that the algorithms are effective for all of the error types. For example, in a dictionary of 10,000 words, without a priori knowledge of the types of errors being processed, the contextual postprocessor was able to correct 81 percent of single substitution errors, 57.7 percent of deletions, and 63.2 percent of double substitution errors. Numerous experiments were performed to examine the performance of the postprocessing algorithms as a function of dictionary size, as a function of word length, and as a function of the size of the contextual data base Dissert. Abstr.

N77-12798# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
DISTRIBUTED COMPUTATION AND TENEX-RELATED ACTIVITIES Quarterly Progress Report, 1 Feb. - 30 Apr. 1976
R. Schantz and R. Thomas Jun. 1976 18 p
(Contract N00014-75-C-0773; ARPA Order 2901)

(AD-A025956; BBN-3315; QPR-6) Avail: NTIS HC A02/MF A01 CSCL 09/2

This report describes BBN efforts in the design of the National Software Works system and BBN efforts to integrate TENEX into the National Software Works system. Author (GRA)

N77-14080*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
TWO MBASIC PROGRAMS THAT WRITE APPLICATION PROGRAMS FOR ACCESSING A DATABASE
R. M. Smith *In its* The Deep Space Network 15 Dec. 1976 p 105-113 refs
Avail: NTIS HC A08/MF A01 CSCL 09B

A method was desired to relieve the tedium of writing and testing application programs. Two utility programs were developed to produce application programs that perform relational operations on data. No coding is performed by the user. Author

N77-14776# Mitre Corp., Bedford, Mass.
RESEARCH AND DEVELOPMENT NEEDS FOR COMPUTER PERFORMANCE EVALUATION
J. A. Maskin Jun. 1976 57 p refs
(Contract F19628-76-C-0001; AF Proj. 572C)
(AD-A026965; MTR-3108; ESD-TR-76-142) Avail: NTIS HC A04/MF A01 CSCL 09/2

Computer performance evaluation (CPE) will continue to have a major impact on new and existing computer systems within the Air Force. To identify areas where potentially significant benefits might accrue, an investigation of present CPE tools and techniques as well as those not available or generally not applied inside the Air Force was initiated. Four broad areas which relate to computer system performance were investigated: cost as a measure of performance, system architectures and their impact on CPE, CPE considerations of data base management systems, and computer facility operational and procedural CPE factors. Expansion of CPE to facility management is identified as a major area of performance improvement potential. Recommendations are given for a number of follow-on investigations. GRA

N77-16004# BDM Corp., Vienna, Va.
CENTRAL FLOW CONTROL SOFTWARE SYSTEMS ANALYSIS. VOLUME 1: EXECUTIVE SOFTWARE STUDY Final Report
George C. Kershaw Jul. 1976 33 p
(Contract DOT-FA76WA-3792)
(AD-A030399/0; FAA-RD-76WA-3792-1-Vol-1;
FAA-RD-76-180-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

An analysis of the 9020 Monitor was conducted to identify added functional capabilities necessary to support central flow control data base requirements. Management of the memory, processors, and peripheral storage devices is described. Multiprocessing and multiprogramming techniques are discussed. Author

N77-16005# BDM Corp., Vienna, Va.
CENTRAL FLOW CONTROL SOFTWARE SYSTEMS ANALYSIS. VOLUME 2: DATA BASE SOFTWARE STUDY Final Report
George C. Kershaw and Travis D. Guye Jul. 1976 92 p
(Contract DOT-FA76WA-3792)
(AD-A030352/9; FAA-RA-76WA-3792-Vol-2;
FAA-RD-76-180-Vol-2) Avail: NTIS HC A05/MF A01 CSCL 09/2

The operational requirements of central flow control were analyzed to determine the database structure and database software requirements. This data base administration, data base organization and access, and data independence are discussed. Author

N77-18790# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
A SOLUTION TO THE UPDATE PROBLEM FOR MULTIPLE COPY DATA BASES WHICH USES DISTRIBUTED CONTROL
Robert H. Thomas Jul. 1975 52 p refs
(Contract N00014-75-C-0773; ARPA Order 2935)
(AD-A028251; BBN-3340) Avail: NTIS HC A04/MF A01 CSCL 09/2

A majority consensus algorithm which represents a new solution to the update synchronization problem for multiple copy data bases is presented. The algorithm embodies distributed control and can function effectively in the presence of communication and data base site outages. The correctness of the algorithm is demonstrated and the cost of using it is analyzed. Several examples that illustrate aspects of the algorithm operation are included in an appendix. Author (GRA)

N77-18798# Mitre Corp., Bedford, Mass.
A REVIEW OF SOFTWARE COST ESTIMATION METHODS
J. A. Clapp Aug. 1976 51 p refs
(Contract F19628-76-C-0001; AF Proj. 572H)
(AD-A029748; MTR-3264; ESD-TR-76-271) Avail: NTIS HC A04/MF A01 CSCL 09/2

Software costs are becoming an increasingly larger portion of the cost of major military systems. This report presents the basic problems in estimating the cost of software development. Current strategies for making estimates are summarized and evaluated. Changes in the management of software acquisition and in the software development methods for large defense systems can improve software cost estimation. A number of these changes are identified. Author (GRA)

N77-18799# Desmatics, Inc., State College, Pa.
A SMALL-SCALE INVESTIGATION OF STATISTICS FOR DETERMINING THE NUMBER OF CLUSTERS IN A DATA BASE
Dennis E. Smith and Robert L. Gardner Sep. 1976 28 p refs
(Contracts N00014-74-C-0154; N00014-75-C-1054;
NR Proj. 105-757; NR Proj. 042-334)
(AD-A030586; TR-102-3) Avail: NTIS HC A03/MF A01 CSCL 09/2

In construction of a predictive mathematical model of impact acceleration injury, changes in evoked potential response may serve to provide important information. In attempting to determine whether a number of different types of changes exist, cluster analysis may be used. This report describes a limited Monte Carlo examination of four statistics (used in conjunction with Ward's hierarchical clustering algorithm) for identifying the number of clusters built into a simulated ten-dimensional data space. Author (GRA)

N77-22888# Naval Research Lab., Washington, D. C.
THE CODASYL DATA DESCRIPTION LANGUAGE: STATUS AND ACTIVITIES
Frank A. Manola 22 Nov. 1976 34 p refs
(RF21211401)
(AD-A033401; NRL-8038) Avail: NTIS HC A03/MF A01 CSCL 09/2

The CODASYL Data Description Language Committee (DDLC) was instituted to take the work of the CODASYL Data Base Task Group (DBTG), as reflected in its April 1971 Report as base and to develop from it specifications for a host-language independent data description language (the schema DDL). The DDLC held its first meeting November 30, 1971. Various changes have been made in the schema DDL language specifications to reflect the development of data base systems technology. This report describes briefly the current status and activities of the CODASYL DDLC, the status of the DDLC language specifications, and future directions for DDLC work. GRA

N77-22889# BDM Corp., El Paso, Tex.
ON THE DESIGN OF AN EXECUTIVE PROGRAM AND A COMMON SIMULATION LANGUAGE TRANSLATOR FOR A SYSTEMS ANALYSIS PROGRAM Final Report
Allan F. Malmberg Sep. 1976 235 p refs
(Contract F29601-74-C-0017)
(AD-A033296; BDM/E-47-75-F-0017; AFWL-TR-75-272) Avail: NTIS HC A11/MF A01 CSCL 09/2

Development work towards the realization of an executive program and language translator for use with a systems analysis program for vulnerability assessment is described. The executive program permits sequencing of arbitrary application modules on

a stand alone basis and provides for exchange of data between modules. An Executive Control Language is described for programming the actions of the executive program. The Common Simulation Language is described which incorporates many of the features of the NET-2, SCEPTRE, and CIRCUS-2 simulation languages. Techniques and difficulties associated with the automated translation of Common Simulation Language text to the equivalent NET-2, SCEPTRE, and CIRCUS-2 language texts are discussed. Programs for automatically generating LR(k) parsers and multi-scanner lexical analyzers are also described.
Author (GRA)

N77-23788# Naval Postgraduate School, Monterey, Calif.
STATISTICAL ANALYSIS OF NON-STATIONARY SERIES OF EVENTS IN A DATA BASE SYSTEM
Peter A. W. Lewis and Gerald S. Shedler (IBM Research Lab., San Jose, Calif.) Sep. 1976 55 p refs
(NR Proj. 042-284)
(AD-A033708; NPS-55LW76092) Avail: NTIS HC A04/MF A01 CSCL 12/1

Central problems in the performance evaluation of computer systems are the description of the behavior of the system and characterization of the workload. One approach to these problems comprises the interactive combination of data-analytic procedures with probability modeling. This paper describes methods, both old and new, for the statistical analysis of non-stationary univariate stochastic point processes and sequences of positive random variables. Such processes are frequently encountered in computer systems. As an illustration of the methodology, an analysis is given of the stochastic point process of transactions initiated in a running data base system. On the basis of the statistical analysis, a non-homogeneous Poisson process model for the transaction initiation process is postulated for periods of high system activity and found to be an adequate chracterization of the data. For periods of lower system activity, the transaction initiation process has a complex structure, with more clustering evident. Overall models of this type have application to the validation of proposed data base (sub) system models.
Author (GRA)

N77-24821# University of Southern Calif., Marina del Rey. Information Sciences Inst.
THE DESIGN OF DATA TYPE SPECIFICATIONS
John V. Guttag, Ellis Horowitz, and David R. Musser Nov. 1976 28 p refs
(Contract DAHC15-72-C-0308; ARPA Order 2223)
(AD-A034827; ISI/RR-76-49) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report concerns the design of data types in the creation of a software system; its major purpose is to explore a means for specifying a data type that is independent of its eventual implementation. The particular style of specification, called algebraic axioms, is exhibited by axiomatizing many commonly used data types. These examples reveal a great deal about the intricacies of data type specification via algebraic axioms, and also provide a standard to which alternative forms may be compared. Further uses of this specification technique are in proving the correctness of implementations and in interpretively executing a large system design before actual implementation commences.
Author (GRA)

N77-25890# System Development Corp., Santa Monica, Calif.
SOFTWARE DATA COLLECTION STUDY. VOLUME 1: SUMMARY AND CONCLUSIONS Final Technical Report, Jun. 1975 - Jun. 1976
N. E. Willmorth, M. C. Finfer, and M. P. Templeton Griffiss AFB, N. Y. RADC Dec. 1976 123 p
(Contract F30602-75-C-0248)
(AD-A036115; DSC-TM-5542/001/01-Vol-1) Avail: NTIS HC A06/MF A01 CSCL 09/2

The burgeoning costs of software development have centered research interest in software methodology, project productivity and program reliability. However, such research is hindered by the lack of standard, reliable data for an adequate sample of software projects upon which to base conclusions. RADC proposes to establish a repository in which software development data may be accumulated; this study was conducted to generate recommendations concerning a data collection systems for that repository. The objective of the study was to investigate: Data collection problems; Data requirements for productivity, software reliability and cost studies; Data entry/data management interface; Specifications for a software data collection and reporting system.
GRA

N77-26830# Pennsylvania Univ., Philadelphia. Wharton School of Finance and Commerce.
WAND USER'S GUIDE Final Report
Rob Gerritsen, Ricardo Cortes, Jim Ribeiro, and Ruth Zowader 15 Apr. 1976 47 p
(Contract N00014-75-C-0462)
(AD-A037436; Rept-76-01-03) Avail: NTIS HC A03/MF A01 CSCL 09/2

This guide presents the basic concepts of WAND, a Database Management System. The first section presents the major concepts and terminology of WAND. It also introduces the Data Description Language (DDL) and the Data Manipulation Language (DML). The second section describes in detail the DDL and the procedures used to create the schema. The third section contains the DML statements and several examples illustrating their use.
Author (GRA)

N77-26832# Pennsylvania Univ., Philadelphia. Wharton School of Finance and Commerce.
WAND DEMONSTRATION Final Report
Rob Gerritsen and Howard L. Morgan Jun. 1976 16 p Presented at the SIGMOD Conf., Washington, D. C., 2-4 Jun. 1976
(Contract N00014-75-C-0462)
(AD-A037199; Rept-76-06-01) Avail: NTIS HC A02/MF A01 CSCL 09/2

A demonstration of the online interactive user interface in the WAND system. Various features are demonstrated including an interactive data manipulation language, a bootstrapping HELP facility, and schema browsing commands. WAND is a plex DBMS fashioned after the CODASYL database task group (DBTG) specifications.
Author (GRA)

N77-27771# System Development Corp., Santa Monica, Calif.
SOFTWARE DATA COLLECTION STUDY: PROCEEDINGS OF THE DATA COLLECTION PROBLEM CONFERENCE
N. E. Willmorth Griffiss AFB, N. Y. RADC Dec. 1976 24 p Conf. held at Santa Monica, Calif., 9 Dec. 1975
(Contract F30602-75-C-0248)
(AD-A037301; SDC-TM-5542/006/01; RADC-TR-76-329-Vol-6) Avail: NTIS HC A02/MF A01 CSCL 09/2

A conference was held in December 1975 to discuss the problems of software data collection. Participants were SDC contract personnel associated with one of three software data repositories and the military, civil service, and contract personnel owning or managing these repositories. The repositories included the proposed RADC Software Data Repository, the Space and Missiles Systems Organization's Satellite Control Facility Computer Program Development Library, and the Army Ballistic Missiles Division's Advanced Technology Center Quantitative Data Base. Each repository presented its objectives and described the data collection problems they have encountered. A general discussion of data collection problems ensued, centering around standardization, the reluctance to release sensitive data, and the bias and subjectivity of project reports. No real solutions to the problems were forthcoming but participants left the conference with a better appreciation of the problem.
Author (GRA)

N77-28833# PRC Information Sciences Co., McLean, Va.
RASTER IMAGING SOFTWARE Final Technical Report, Jul. 1974 - Jun. 1976
R. Lubbes, Patricia A. Macera, and Kathryn S. Przewlocki Mar. 1977 69 p
(Contract F30602-74-C-0345)
(AD-A039024; RADC-TR-76-340-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 09/2

The Raster Imaging Software was developed to support raster plotting capabilities existing at RADC. The software consists of (1) interactive symbol and text placement capability which operates on the RADC Experimental Compilation Console; and (2) batch processing software to convert lineal data to raster for plotting. Included in the lineal to raster conversion software in addition to creating line weights is the capability to fill areas with a solid fill or pattern fill, to fill between contours of different elevations (elevation tints) to perform priority masking, and to generate point symbols and alpha-numerics in raster format.
Author (GRA)

N77-28842# System Development Corp., Santa Monica, Calif.
SOFTWARE DATA COLLECTION STUDY. VOLUME 7: COMPENDIUM OF PROCEDURES AND PARAMETERS Final Technical Report, Jun. 1975 - Jun. 1976
M. Finfer and M. Templeton Griffiss AFB, N. Y. RADC Dec. 1976 292 p
(Contract F30602-75-C-0248)
(AD-A038247; SDC-TM-5542/007/01-Vol-7; RADC-TR-76-329-VOL-7) Avail: NTIS HC A13/MF A01 CSCL 09/2

This compendium supports the RADC Software Data Collection Study for providing an annotated compilation of recommended data collection forms, a suggested data base structure, and a summary list of definitions of the data parameters. A modular design approach was taken to the construction of the forms and the suggested data base structure. Data item priorities, collection frequency, and project size and complexity requirements were taken into account in defining modules. The system is deemed flexible in meeting the needs of future changes and expansions to the RADC repository operations.
Author (GRA)

N77-28844# Naval Postgraduate School, Monterey, Calif.
AN ANALYSIS OF DATA BASE QUERY LANGUAGES M.S. Thesis
Dennis Elliot Lough and Allen Dale Burns Mar. 1977 63 p refs
(AD-A039783) Avail: NTIS HC A04/MF A01 CSCL 09/2

An abundance of data base management systems and query languages already exist, not to mention those which have been, and continue to be proposed. Most data base management system surveys focus on the type of model used to represent the data, methods of access, protection, etc. This paper acquaints the EDP manager with the fundamental differences among the more significant query languages, with emphasis on those characteristics which should be considered when choosing a query language. The term query language as used here has been expanded to include the entire user interface to the data base, and encompass both data sublanguages and stand-alone query languages.
Author (GRA)

N77-28820 Purdue Univ., Lafayette, Ind.
THEORETICAL DESCRIPTION OF AN ACCESS LANGUAGE FOR A GENERAL DECISION SUPPORT SYSTEM Ph.D. Thesis
Robert Henry Bonczek 1976 216 p
Avail: Univ. Microfilms Order No. 77-7419

An access language for the GPLAN system is studied. Various forms of the logical structure of the knowledge base are considered, and all are found equivalent, in particular the CODASYL network data model and the Relational data model. A linguistic characterization of a logical data structure is given, providing one basis for data base design. The GPLAN Mapping Language is defined linguistically using a transformational grammar. Special interactive inverse transformations provide a user-directed means of relationship evaluation. Other transformations provide data access security, thus incorporating the security aspects of the system into the language definition. A semantic net is implemented within the data base framework, with simple extensions and modifications. Data nodes of the semantic net are also replaced by programs, allowing the construction of models. The language is thus further extended, since reference to a program in the semantic net causes the execution of that program. The programs are self-documenting.
Dissert. Abstr.

N77-28836# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Civil Engineering.
REPRESENTATION OF A COMPUTER-AIDED ITERATIVE DESIGN PROCESS M.S. Thesis
Martin A. Tamm and Steven T. Fenves Apr. 1977 51 p refs
(Contract N00014-76-C-0354)
(AD-A039384; R-77-5) Avail: NTIS HC A04/MF A01 CSCL 09/2

A network representation of the iterative design process has been presented. The representation is closely based on that previously developed for non-iterative design checking. The representation uses two sets of data values, denoted as Level 1 and Level 2, in a manner similar to first-order iterative computational schemes. Certain data values, designated internally modifiable parameters, serve as a reference between successive cycles. Provisions are made for retaining certain data between cycles, so as to suppress calculations in some iterations, when it is felt that the results are insensitive to changes in certain data values. The representation is illustrated through the application to a typical structural design problem. Detailed data structures and transformation process are presented. In the case of data, it is shown that the subscripted nature of the data must be explicitly taken into account, whereas the non-iterative process can be represented in terms of generic, or unsubscripted, data. The recursive procedures for evaluating and modifying data have been extended to handle the two-level, subscripted data representation. Four additional processes are defined: Those to ACCEPT or REJECT the current cycle of results, and those to RETAIN and RELEASE data between cycles.
Author (GRA)

N77-30798 Purdue Univ., Lafayette, Ind.
A QUASI-INTERACTIVE APPROACH TO COMPUTER ASSISTED INSTRUCTION Ph.D. Thesis
Sharon Kay Fletcher 1976 142 p
Avail: Univ. Microfilms Order No. 77-7448

The development of a quasi-interactive approach to CAI courseware presentation is presented based on lengthened student system interaction intervals. When used on general purpose (non-dedicated) computing facilities results are in lower cost and lower impact on the host system. The low cost quasi-interactive approach makes practical the use of CAI by large numbers of students, without the need to turn to expensive dedicated equipment. The courseware structure which was developed is based on the concept of a task, a unit of information, directions, questions, etc., to be presented to the student, requiring that some response be made by the student after some time delay. The task also contains correct, and possibly anticipated wrong, responses and feedback of several types.
Dissert. Abstr.

N77-30810# Ohio State Univ., Columbus. Computer and Information Science Research Center.
SOFTWARE REQUIREMENTS FOR SUPPORTING HIERARCHICAL DATABASES
David K. Hsiao, Douglas S. Kerr, and Fred K. NG Apr. 1977 105 p refs
(Contract N00014-75-C-0573)
(AD-A039038; OSU-CISRC-TR-77-1) Avail: NTIS HC A06/MF A01 CSCL 05/2

This report shows the capability of the database computer (DBC) for supporting hierarchical data models and systems. Since IBM's Information Management System (IMS) is the most widely used data management system which supports a hierarchical view of data, we intend to show that the DBC can support IMS databases and IMS application programs. Furthermore, this study provides us with a case for comparing the merits of using a conventional general-purpose computer versus a special-purpose database computer (i.e., the DBC) for data management. It is shown that it is possible to design an interface, known as IMSI between IMS users and the DBC. The IMSI can faithfully execute the DL/1 calls (the data manipulation language of IMS) issued by

IMS users. The design of the IMSI is considered in two phases. In the first phase, we show how to represent an IMS database utilizing the built-in (hardware) data structure of the DBC. This representation makes use of the concept of embedding symbolic identifiers into all dependent segments of an IMS database. The use of symbolic identifiers increases the degree of data independence of the stored database. Furthermore, the storage requirement for the symbolic identifiers is substantially offset by the removal of the conventional address pointers currently used in an IMS database. GRA

N77-30812# Naval Research Lab., Washington, D. C. Space Systems Div.

SOLRAD-11 ON-LINE SYSTEM (SOLOLS), APPLICATIONS SOFTWARE: INTERIM SYSTEM

Leonard S. Wagner and Donald R. Uffelman Mar. 1977 117 p

(AD-A039604; NRL-MR-3466) Avail: NTIS MF A01 CSCL 09/2

The NRL applications software package in the 'interim' system is a multi-tasking code embodying a single task overlay and is resident on a Data General NOVA 800 minicomputer. The operating tasks are a data display task, QLOOK; a data base write task, UPDTDB; a communications driver task, NLINK2, and a message processing task, PROCT. All tasks other than QLOOK are continuously core resident during operation. QLOOK, because of its size, must be overlayed with only a small root program continuously core resident. QLOOK is the main system task in the sense that it prepared the system to receive the other tasks and then activates them. Once a task is activated, access to the CPU is determined by the RDOS (real-time disk operating system) TASK SCHEDULER according to priority. Since the data display task is of lesser urgency than the real-time data base update, QLOOK lowers its priority after activating the other tasks. The RDOS protocol for task ACTIVATE, ABORT, READY and SUSPEND is designed to make most efficient use of the CPU. Providing adequate access to the CPU for each task is largely a design factor for the code designer. GRA

N77-31842# Experimental and Mathematical Physics Consultants, Santa Monica, Calif.

THE MASTER PROGRAM FILE, METHODS AND MODELS Final Report

T. M. Jordan Kirtland AFB, N. Mex. AFWL May 1977 63 p refs

(Contract F29601-75-C-0107; AF Proj. 4695)

(AD-A041943; AFWL-TR-76-197) Avail: NTIS HC A04/MF A01 CSCL 09/2

The MASTER Program File is a collection of subprograms and data libraries used in solving radiation transport problems. This report describes methods and models used in the program. Program capabilities range from 1-dimensional problems through complex geometry, nonlinear, time-dependent problems. Particle physics models include primary and secondary photons, electrons, neutrons and heavy charged particles. Numerical methods include approximate transport kernels, direct numerical integration and MONTE CARLO quadratures. Author (GRA)

N77-31884# RAND Corp., Santa Monica, Calif.

AN INTRODUCTION TO PRODUCTION SYSTEMS

D. A. Waterman Nov. 1976 15 p refs

(AD-A040891; P-5751) Avail: NTIS HC A02/MF A01 CSCL 09/2

Production systems provide a simple, uniform way of handling control flow and data management in programs which exhibit intelligent behavior. They are particularly useful for developing programs which can learn from experience, i.e., which can demonstrate adaptive behavior. In this brief introduction to the subject the concept of the production system is defined, and simple examples of production systems are presented. Current applications of production system technology are also discussed. Author (GRA)

N77-31886# Ohio State Univ., Columbus. Computer and Information Science Research Center.

DBC SOFTWARE REQUIREMENTS FOR SUPPORTING NETWORK DATABASE

Jayanta Banerjee, David K. Hsiao, and Douglas S. Kerr Jun. 1977 99 p refs

(Contract N00014-75-C-0573)

(AD-A041851; OSU-CISRC-TR-77-4) Avail: NTIS HC A05/MF A01 CSCL 05/2

This is the second of a series of reports aimed at studying the capabilities of a database computer, known as the DBC, in supporting the three major data models: hierarchical, network, and relational. In the first report, DBC software requirements for handling hierarchical databases have been presented. This report will be directed towards an investigation of the software requirements for network databases. Relational database systems will be treated in a forthcoming report. The April 1971 report of the CODASYL database Task Group (DBTG) is chosen as the definitive document of network databases and systems since most commercially available network data base management systems are based on the DBTG report. Even though many of these commercial systems use a syntax that is slightly different from the DBTG specifications, the main concepts have been retained. The network database model studied in this report will be referred to as the DBTG data model. Our emphasis will be on concepts rather than the detailed syntax of the DBTG language specifications. Database computers are a recent addition to the family of computers. With the advent of large databases, there has been a growing awareness of the necessity of a computer architecture that is oriented towards storage, retrieval, and manipulation of large quantities of information. GRA

N77-32798# Purdue Univ., Lafayette, Ind. Krannert Grad. School.

MATHEMATICAL PROGRAMMING WITHIN THE CONTEXT OF A MANAGEMENT SYSTEM

R. H. Bonczek, C. W. Holsapple, and A. N. Whinston Nov. 1976 42 p refs

(PB-267454/7; Paper-578) Avail: NTIS HC A03/MF A01 CSCL 09B

Aspects of mathematical programming are examined within the context of a generalized data base management and query system. This system is general in the sense of its ability to support applications other than mathematical programming and its independence from the actual types of data values available. It is shown how data for mathematical programming may be organized into a network data structure which may be interrogated via non-procedural, English-like queries. Three methods are presented for interfacing math programming algorithms with this data base. Enhanced data manipulation facilities, particular to matrices and systems of equations, are also introduced. Finally a method is shown whereby programs may be integrated into a data structure, enhancing a user's ability to build alternative models for data analysis. Author

N78-10761# Ohio State Univ., Columbus. Dept. of Computer and Information Science.

CIRC 2 DATA BASE CLASSIFICATION Final Technical Report, 1 Jan. 1976 - 31 Mar. 1977

Lee J. White, Anthony E. Petrarca, Laurel G. Crawford, Barry J. Brinkman, and Sanjay Mittal Jun. 1977 118 p refs

(Contract F30602-76-C-0102)

(AD-A042268; RADC-TR-77-211) Avail: NTIS HC A06/MF A01 CSCL 05/2

This report describes the development of a classification system for the CIRC II Data Base. 98 CIRC II classes are designed which partition the documents of this data base. The software which assigns these classes to incoming documents utilizes a sequential classification algorithm. In this approach, only as much of each document is read to accurately assign one or more classes, together with a confidence probability for each assigned class. In this way, a compromise is obtained between efficiency and accuracy. A number of parameters are available in this software to effect this trade off. Additional software has been developed to analyze sample documents to define the CIRC II classes, producing keywords and frequency distributions over the classes. This software provides flexibility for the classification

system, as a class can be added or deleted, a class modified by submitting additional documents, or the keyword selection criterion can be altered. A number of experiments were conducted using this classification system on CIRC II documents. It was shown that satisfactory classification could be achieved, and a stable set of keywords and frequency distributions obtained.
Author (GRA)

N78-10760# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
VERIFICATION DECIDABILITY OF PRESBURGER ARRAY PROGRAMS Interim Report
Norihisa Suzuki and David Jefferson 14 Jun. 1977 23 p refs
(Contracts F44620-73-C-0074; DAHC15-72-C-0308)
(AD-A043451; AFOSR-77-1138TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

A program annotated with inductive assertions is said to be verification decidable if all of the verification conditions generated from the program and assertions are formulas in a decidable theory. The Presburger array theory, is defined, containing two logical sorts: integer and array-of-integer. Addition, subtraction, and comparisons are permitted for integers. Array contents and assign functions, and, since the elements of the arrays are integers, array accesses may be nested. The first result is that the validity of unquantified formulas in Presburger array theory is decidable, yet quantified formulas in general are undecidable. GRA

N78-10770# New York Univ., N. Y.
ECONOMICS OF PROPERTY RIGHTS AS APPLIED TO COMPUTER SOFTWARE AND DATA BASES
Yale M. Braunstein and Deitrich M. Fischer Jun. 1977 131 p refs Sponsored by the National Commission on New Technological Uses of Copyrighted Works
(PB-268787/9; CONTU-77-0005) Avail: NTIS HC A07/MF A01 CSCL 09B

Several major discussions are reviewed. The first of which qualitatively compares the relative incentives to computer software producers found in alternative regimes of copyright and trade secrecy. The latter is found to have certain dysfunctional qualities which copyright might ameliorate. The second discussion provides a critical view of exemptions from copyright for broad classes of users. Exemptions decrease economic efficiency which would be increased through user charges. The third section creates a model of software production and protection and indicates that the term of copyright protection for software should be very short. The final chapter analyzes the tradeoff between the scope of protection and the length of time for which the protection lasts. It finds that the more there is of one, the less there needs to be of the other. Author

N78-12723# System Development Corp., Santa Monica, Calif.
KNOWLEDGE-BASED SYSTEMS: A TUTORIAL
J. A. Barnett and M. I. Bernstein 30 Jun. 1977 291 p refs
(Contract MDA904-76-C-0343)
(AD-A044883; SDC-TM-(L)-5903/000/00) Avail: NTIS HC A12/MF A01 CSCL 09/2

This report surveys recent and current work in interactive knowledge-based systems (KBS), defining and explaining KBS concepts and technology. Its purpose is to give those who may be interested in the application of such systems a means of assessing their present potential use. It explores both the capabilities and the limitations of KBS technology as they are observable and predictable in existing systems, and provides references and a bibliography that will permit those who want to further explore this topic on their own. GRA

N78-13776# Duke Univ., Durham, N. C. Dept. of Electrical Engineering
EQN MODELS FOR THE ANALYSIS AND DESIGN OF A COMPUTER NETWORK OF FUNCTIONALIZED PROCESSORS Final Report, 15 Jul. 1976 - 30 Aug. 1977 Ph.D. Thesis
Robert L. Leech 30 Jul. 1977 200 p refs
(Grant DAAG29-76-G-0309)
(AD-A045721; ARO-14533.1-A-EL) Avail: NTIS HC A09/MF A01 CSCL 09/2

Network Queuing Theory is used to establish three Exponential Queuing Network (EQN) models of computer network systems. A projected computer network is based on the specification of processing functions for model representation. Example functions used in this work are computation, data base management, communications and terminal/access interface as would be applicable to a military command and control computer system. The models may be used for trade-off analysis of critical performance criteria. Additionally, a basic method for the synthesis/determination (design) of processor computer power to ensure a load balanced network is ascertained. The three models and their respective computer network evaluations for trade-off analysis are pursued with their inherent advantages and disadvantages. All three models accommodate job routes (types) with one model providing exact solutions for each job type. These models accommodate large numbers of jobs so that an effective total computer network may be modelled. GRA

N78-18880 Case Western Reserve Univ., Cleveland, Ohio.
AN ATTRIBUTE ACCESS PROBABILITY DETERMINATION PROCEDURE Ph.D. Thesis
Jon Dennis Clark 1977 209 p
Avail: Univ. Microfilms Order No. 77-25151

The efficient structure of a data base is crucial to the operation of an information processing system. Many algorithms were developed to select an efficient storage structure; all, however, depend on some expression of the level of activity of a given element or attribute in each request for data. The literature and practice, unfortunately, has not provided much insight into the problem of attribute access probability determination in a manner which is not biased due to the actions of hardware and software support systems. The various types of bias are described, and current practices compared to the use of the new procedure in light of these biases. The basic thesis is: an organized and substantially automatable procedure for usage and access statistics (attribute access probability) collection can be defined which will operate on the computer programs used to access the files as well as inputs to them and outputs produced by them.
Dissert. Abstr.

N78-17725*# Kansas Univ., Lawrence. Dept. of Computer Science.
A DATABASE SYSTEM TO SUPPORT IMAGE ALGORITHM EVALUATION Final Report, 15 Nov. 1976 - 31 Dec. 1977
Y. Edmund Lien 31 Dec. 1977 221 p refs
(Grant NsG-8046)
(NASA-CR-155928) Avail: NTIS HC A10/MF A01 CSCL 09B

The design is given of an interactive image database system IMDB, which allows the user to create, retrieve, store, display, and manipulate images through the facility of a high-level, interactive image query (IQ) language. The query language IQ permits the user to define false color functions, pixel value transformations, overlay functions, zoom functions, and windows. The user manipulates the images through generic functions. The user can direct images to display devices for visual and qualitative analysis. Image histograms and pixel value distributions can also be computed to obtain a quantitative analysis of images. Author

N78-19781*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THREE-DIMENSIONAL COMPUTATIONAL AERODYNAMICS IN THE 1980'S
Harvard Lomax *In its* Future Computer Requirements for Computational Aerodynamics Feb. 1978 p 33-38

Avail: NTIS HC A22/MF A01 CSCL 09B

The future requirements for constructing codes that can be used to compute three-dimensional flows about aerodynamic shapes should be assessed in light of the constraints imposed by future computer architectures and the reality of usable

algorithms that can provide practical three-dimensional simulations. On the hardware side, vector processing is inevitable in order to meet the CPU speeds required. To cope with three-dimensional geometries, massive data bases with fetch/store conflicts and transposition problems are inevitable. On the software side, codes must be prepared that: (1) can be adapted to complex geometries, (2) can (at the very least) predict the location of laminar and turbulent boundary layer separation, and (3) will converge rapidly to sufficiently accurate solutions.
Author

N78-19943# Ohio State Univ., Columbus. Computer and Information Science Research Center.
DBC SOFTWARE REQUIREMENT FOR SUPPORTING RELATIONAL DATABASES
Jayanta Banerjee and David K. Hsiao Nov. 1977 88 p refs
(Contract N00014-75-C-0573)
(AD-A049180; OSU-CISRC-TR-77-7) Avail: NTIS
HC A05/MF A01 CSCL 05/2

This is the final report of a series of work aimed at demonstrating the capabilities of a back-end database computer (DBC) in supporting known data models and systems. In the previous two reports, it was shown that existing hierarchical and network database management systems, in particular, the Information Management System (IMS) of IBM and DMS1100 of UNIVAC, can be supported on the DBC with a vastly improved performance. In this final report, we study a relational database management system, namely System R, with a view to supporting such a system on the DBC. The early sections of this report are introductory in nature. The representation of relational tuples in the DBC is quite straightforward. The data items of every tuple are converted to attribute-value pairs to form a single DBC record. Two special attribute-value pairs are also included in each DBC record in order to indicate the relation to which the corresponding tuple belongs, and to provide certain clustering information. User transactions in the data sublanguage, called SEQUEL, are converted to a series of DBC commands. The commands are so structured that the DBC can simultaneously access a number of records, the contents of which satisfy the predicates in a SEQUEL query. Given a particular command, the DBC uses its directory to determine the portions of its secondary storage that need to be content-searched.
GRA

N78-22791# Logicon, Inc., San Diego, Calif.
ADAPT 1 UNIFORM DATA LANGUAGE (UDL): A FINAL SPECIFICATION Final Report, 1 Nov. 1977 - 30 Jan. 1978
L. R. Erickson, M. E. Sologlad, and S. L. Westermark 30 Jan. 1978 153 p
(Contract N00014-78-C-0899)
(AD-A050865; Rept-78-C-0899-1) Avail: NTIS
HC A08/MF A01 CSCL 05/2

Under the adapt project, a prototype intelligent terminal will be developed which provides users and/or other systems a uniform interface for accessing multiple on line data bases located on different systems. The underlying technology applied by ADAPT will be the transformation from one uniform data language, UDL, to other target query languages which reside on a network. ADAPT will be comprised of four phases ADAPT 1 provides the fundamental ADAPT system architecture baseline for subsequent phases and also a limited user data base query and display facility for four data base management systems. ADAPT 2 will provide users a data base maintenance facility for four DBMSs, as well as data display enhancements. ADAPT 3 will produce two production models of ADAPT, one installed in network centers and the other as a stand-alone intelligent terminal. ADAPT 4 will provide a local data base manager for onsite file creation.
Author (GRA)

N78-24820# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
THE USE OF RELATIONAL THEORY AS A DESIGN TOOL
M. C. F. King Jul. 1977 39 p refs
(CSIR-SR-WISK-262; ISBN-0-7988-1162-5) Avail: NTIS
HC A03/MF A01

The application of relational data base concepts in the design of systems implemented in currently available technology is described. The importance of a 3NF network view as the basis for design is emphasized.
Author

N78-26782 Stanford Univ., Calif.
AUTOMATIC CONSTRUCTION OF ALGORITHMS AND DATA STRUCTURES USING A KNOWLEDGE BASE OF PROGRAMMING RULES Ph.D. Thesis
David Robbins Barstow 1978 285 p
Avail: Univ. Microfilms Order No. 78-08781

An explication is given of certain kinds of programming knowledge to a sufficient level of detail that it can be used effectively by a machine in the task of constructing concrete implementations of abstract algorithms in the domain of symbolic programming. Knowledge about several aspects of symbolic programming is expressed as a collection of four hundred refinement rules. The rules deal primarily with collections and mappings and ways of manipulating such structures, including several enumeration, sorting and searching techniques. The principle representation techniques covered include the representation of sets as linked lists and arrays (both ordered or unordered), and the representation of mappings as tables, sets of pairs, property list markings, and inverted mappings (indexed by range element). In addition to these general constructs, many low-level programming details are covered (such as the use of variables to store values).
Dissert. Abstr.

N78-26770# Stanford Univ., Calif. Dept. of Computer Science.
AUTOMATIC CONSTRUCTION OF ALGORITHMS AND DATA STRUCTURES USING A KNOWLEDGE BASE OF PROGRAMMING RULES
David R. Barstow Nov. 1977 222 p
(Contract MDA903-76-C-0206; ARPA Order 2494)
(AD-A053184; SU-STAN-CS-77-641; AIM-308) Avail: NTIS
HC A10/MF A01 CSCL 09/2

Although large amounts of programming knowledge are available to human programmers in the form of books and articles, very little of this knowledge is available in a form suitable for use by a machine in performing programming tasks automatically. The principal goal of the research reported here is the explication of programming knowledge to a sufficient level of detail that it can be used effectively by a machine. The programming task considered in this experiment is that of constructing concrete implementations of abstract algorithms in the domain of symbolic programming. Knowledge about several aspects of symbolic programming has been expressed as a collection of four hundred refinement rules. The rules deal primarily with collections and mappings and ways of manipulating such structures, including several enumeration, sorting and searching techniques. The principal representation techniques covered include the representation of sets as linked lists and arrays (both ordered and unordered), and the representation of mappings as tables, sets of pairs, property list markings, and inverted mappings (indexed by range element). In addition to these general constructs, many low-level programming details are covered (such as the use of variables to store values)
GRA

N78-28840# California Univ., Livermore. Lawrence Livermore Lab.
POST-PROCESSING OF MASTER CONTROL OUTPUT: A DESCRIPTION AND EXPLANATION OF TWO TRIX ALTER FILES
R. W. Kuhn, Keith W. Johnson, and Hank Moll 30 Jan. 1978 27 p
(Contract W-7405-eng-48)
(UCID-17739) Avail: NTIS HC A03/MF A01

A guide for users of the master control data base management system in preparing their output for publications is provided. It is not a comprehensive manual, nor are the TRIX alter files described general purpose routines, although some flexibility can be obtained by modifying them to satisfy particular requirements. The work described takes advantage of useful features in TRIX TRIX/RED and REDPP. By creating alter files which post-process normal output, these features are provided with a minimum of inconnvenience to users.
ERA

N78-28846# Los Alamos Scientific Lab., N. Mex.
COMPUTER GRAPHICS FOR EXTRACTING INFORMATION FROM DATA
R. K. Lohrding, M. M. Johnson, and D. E. Whiteman 1978 22 p refs Presented at 11th Symp. on the Interface of Computer Sci. and Statistics, Raleigh, N. C., 6 Mar. 1978
(Contract W-7405-eng-36)
(LA-UR-77-3004; Conf-780317-2) Avail: NTIS HC A02/MF A01

Computer graphics which are useful for displaying and analyzing data are presented. Many classical and several newly developed graphical techniques in statistical data analysis are presented for small univariate and multivariate data sets. These include histograms, empirical density functions, pie charts, contour plots, a discriminant analysis display, cluster analysis, Chernoff faces, Andrews' sine curves, three dimensional plots, and probability plots. Recent advances in data collection technology and computer data base management systems have made it imperative to utilize computer graphics for large data sets. Several innovative graphical techniques are presented to handle this situation. Spatial relationships among the data (particularly geographic data) are difficult to conceptualize. Several cartographic techniques are presented which enhance the understanding of these spatial relationships within the data. ERA

N78-31783*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPAR DATA HANDLING UTILITIES
Gary L. Giles and Raphael T. Haftka (Illinois Institute of Technology) Sep. 1978 50 p refs
(NASA-TM-78701; L-12108) Avail: NTIS HC A03/MF A01 CSCL 09B

The SPAR computer software system is a collection of processors that perform particular steps in the finite-element structural analysis procedure. The data generated by each processor are stored on a data base complex residing on an auxiliary storage device, and these data are then used by subsequent processors. The SPAR data handling utilities use routines to transfer data between the processors and the data base complex. A detailed description of the data base complex organization is presented. A discussion of how these SPAR data handling utilities are used in an application program to perform desired user functions is given with the steps necessary to convert an existing program to a SPAR processor by incorporating these utilities. Finally, a sample SPAR processor is included to illustrate the use of the data handling utilities. G.G.

N78-33773 Oklahoma Univ., Norman.
AN INTERACTIVE SYSTEM FOR THE GENERATION OF STANDARDIZED AUTOPSY PROTOCOLS Ph.D. Thesis
Seymour Fox 1977 388 p
Avail: Univ. Microfilms Order No. 7815358

An interactive standardized autopsy protocol generation system was designed and implemented which demonstrates a unique approach to generating narrative reports interactively. The nucleus of the system is the pathology information data base which contains two complementary files: (1) the frame file and (2) the output text file. To permit the generation of grammatically correct English sentences, a file of sentences was created which, in effect, expanded the information contained in the flow diagrams to sentences. A detailed description of the logical organization of the system software and the various operations involved in the generation of autopsy protocol is presented. A discussion of the various features which were incorporated into the system software to facilitate the interaction between the pathologist and the system is also included. Dissert. Abstr.

N78-33776*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ENGINEERING AND SCIENTIFIC DATA MANAGEMENT
1978 255 p refs Proc. of Conf. held at Hampton, Va., 18-19 May 1978 Sponsored in part by the Inst. for Computer Appl. in Sci. and Eng., and the George Washington Univ. Joint Inst. for Advan. of Flight Sci., Hampton, Va.
(NASA-CP-2055; L-12043) Avail: NTIS HC A12/MF A01 CSCL 09B

The application of data management systems to engineering and scientific data is described.

N78-33777*# Carnegie-Mellon Univ., Pittsburgh, Pa.
DESIGN REPRESENTATION AND CONSISTENCY MAINTENANCE NEEDS
Charles M. Eastman and Steven J. Fenves *In* NASA. Langley Res. Center Eng. and Sci. Data Management 1978 p 1-18 refs
(Contract N00014-76-C-0345; Grant NSF MCS-76-19072)
Avail: NTIS HC A12/MF A01 CSCL 09B

Two major issues of data base support for large-scale engineering design are considered. The first deals with the need to support multidisciplinary, hierarchical and interactive design without imposing a priori constraints on the sequence of design decisions. An abstract logical model of the data base capable of such support is outlined. The second issue deals with the role the data base must play in maintaining integrity and consistency among the data representing the emerging design. A tentative model implementing a number of consistency management functions is presented. G.G.

N78-33778*# Pratt and Whitney Aircraft, East Hartford, Conn.
CAD/CAM DATA MANAGEMENT: NEEDS, REQUIREMENTS AND OPTIONS
Richard S. Lopatka and Thomas G. Johnson *In* NASA. Langley Res. Center Eng. and Sci. Data Management 1978 p 25-54 refs
Avail: NTIS HC A12/MF A01 CSCL 09B

The requirements for a data management system in support of technical or scientific applications and possible courses of action were reviewed. Specific requirements were evolved while working towards higher level integration impacting all phases of the current design process and through examination of commercially marketed systems and related data base research. Arguments are proposed for varied approaches in implementing data base systems ranging from no action necessary to immediate procurement of an existing data base management system. G.G.

N78-33780*# Bell Helicopter Co., Fort Worth, Tex.
A DATA MANAGEMENT SYSTEM FOR WEIGHT CONTROL AND DESIGN-TO-COST
Jerry C. Bryant *In* NASA. Langley Res. Center Eng. and Sci. Data Management 1978 p 65-84

Avail: NTIS HC A12/MF A01 CSCL 09B

The definition of the mass properties data of aircraft changed on a daily basis as do design details of the aircraft. This dynamic nature of the definition has generally encouraged those responsible for the data to update the data on a weekly or monthly basis. The by-product of these infrequent updates was the requirement of manual records to maintain daily activity. The development of WAVES changed the approach to management of mass properties data. WAVES has given the ability to update the data on a daily basis thereby eliminating the need for manual records. WAVES has demonstrated that a software product can support a data management system for engineering data. G.G.

N78-33781*# General Motors Corp., Detroit, Mich.
ASSOCIATIVE PROGRAMMING LANGUAGE AND VIRTUAL ASSOCIATIVE ACCESS MANAGER
Carol Price *In* NASA. Langley Res. Center Eng. and Sci. Data Management 1978 p 85-97 refs

Avail: NTIS HC A12/MF A01 CSCL 09B

APL provides convenient associative data manipulation functions in a high level language. Six statements were added to PL/1 via a preprocessor: CREATE, INSERT, FIND, FOR EACH, REMOVE, and DELETE. They allow complete control of all data base operations. During execution, data base management programs perform the functions required to support the APL language. VAAM is the data base management system designed to support the APL language. APL/VAAM is used by CADANCE, an interactive graphic computer system. VAAM is designed to support heavily referenced files. Virtual memory files, which utilize the paging mechanism of the operating system, are used. VAAM supports a full network data structure. The two basic blocks in a VAAM file are entities and sets. Entities are the basic information element and correspond to PL/1 based structures defined by the user. Sets contain the relationship information and are implemented as arrays. G.G.

N78-33782*# National Center for Atmospheric Research, Boulder, Colo.
MANAGEMENT OF ATMOSPHERIC DATA
Roy L. Jenne and Dennis H. Joseph *In* NASA. Langley Res. Center Eng. and Sci. Data Management 1978 p 129-139 refs
Avail: NTIS HC A12/MF A01 CSCL 09B

The establishment and maintenance of meteorological data archives to support various research projects are outlined. Consideration is given to overall data needs for meteorological and climatic research in the university community and to establish the climatology of the Southern Hemisphere from the surface to 10 kPa (100 millibars). G.G.

N78-33783*# Boeing Computer Services, Inc., Seattle, Wash.
SDMS: A SCIENTIFIC DATA MANAGEMENT SYSTEM
William A. Massena *In* NASA. Langley Res. Center Eng. and Sci. Data Management 1978 p 143-154 refs

Avail: NTIS HC A12/MF A01 CSCL 09B

SDMS is a data base management system developed specifically to support scientific programming applications. It consists of a data definition program to define the forms of data bases, and FORTRAN-compatible subroutine calls to create and access data within them. Each SDMS data base contains one or more data sets. A data set has the form of a relation. Each column of a data set is defined to be either a key or data element. Key elements must be scalar. Data elements may also be vectors or matrices. The data elements in each row of the relation form an element set. SDMS permits direct storage and retrieval of an element set by specifying the corresponding key element values. To support the scientific environment, SDMS allows the dynamic creation of data bases via subroutine calls. It also allows intermediate or scratch data to be stored in temporary data bases which vanish at job end. G.G.

N78-33786*# Texas Univ. at Austin.
A DATA MANAGEMENT SYSTEM FOR ENGINEERING AND SCIENTIFIC COMPUTING
Linda Elliot, Hideko S. Kunii, and J. C. Browne *In* NASA. Langley Res. Center Eng. and Sci. Data Management 1978 p 197-222 refs
(Grant NsG-1446)
Avail: NTIS HC A12/MF A01 CSCL 09B

Data elements and relationship definition capabilities for this data management system are explicitly tailored to the needs of engineering and scientific computing. System design was based upon studies of data management problems currently being handled through explicit programming. The system-defined data element types include real scalar numbers, vectors, arrays and special classes of arrays such as sparse arrays and triangular arrays. The data model is hierarchical (tree structured). Multiple views of data are provided at two levels. Subschemas provide multiple structural views of the total data base and multiple mappings for individual record types are supported through the use of a REDEFINES capability. The data definition language and the data manipulation language are designed as extensions to FORTRAN. Examples of the coding of real problems taken from existing practice in the data definition language and the data manipulation language are given. G.G.

N78-33787*# Naval Ship Research and Development Center, Annapolis, Md.
ENGINEERING DATA MANAGEMENT: EXPERIENCE AND PROJECTIONS
David K. Jefferson and Bernard Thomson *In* NASA. Langley Res. Center Eng. and Sci. Data Management 1978 p 223-242 refs
Avail: NTIS HC A12/MF A01 CSCL 09B

Experiences in developing a large engineering data management system are described. Problems which were encountered are presented and projected to future systems. Business applications involving similar types of data bases are described. A data base management system architecture proposed by the business community is described and its applicability to engineering data management is discussed. It is concluded that the most difficult problems faced in engineering and business data management can best be solved by cooperative efforts. G.G.

N79-11787 Office of the Comptroller (Navy), Washington, D. C.
MINIGAP GENERALIZED ANALYSIS PACKAGE: A TOOL FOR AIDING MANAGEMENT IN ANALYSIS OF LARGE DATA BASES. USER'S MANUAL
Sheryl Masiello 20 Apr. 1978 48 p
(AD-A056056; MGAP-UG-01; DOD/DF-78/003B) Avail: NTIS HC A03/MF A01 CSCL 09/2

This document provides the necessary instructions for using MINIGAP. It is aimed at Interdata-knowledgeable users. It assumes that the data has been previously loaded into a MINIGAP database. The specifications of the data files are contained in the MINIGAP PROGRAMMER'S MANUAL. This manual contains samples of outputs generated by MINIGAP. Each sample output report is accompanied with the user-defined input file used to generate the report. Author (GRA)

N79-11788# Office of the Comptroller (Navy), Washington, D. C.
MINIGAP GENERALIZED ANALYSIS PACKAGE: A TOOL FOR AIDING MANAGEMENT IN ANALYSIS OF LARGE DATA BASES. PROGRAMMER'S MANUAL
Sheryl Masiello 20 Apr. 1978 111 p
(AD-A056055; MGAP-PG-01; DOD/DF-78/003A) Avail: NTIS HC A06/MF A01 CSCL 09/2

This document is intended to help programmers understand the software of the MINIGAP report generation and generalized analysis package. It includes flow charts, descriptions of the input files, descriptions of the subroutine modules, and cross-indexing of the subroutine calls. This guide should enable a FORTRAN programmer to understand the MINIGAP system well enough to modify the system as desired. The MINIGAP USER'S MANUAL is necessary to understand how to use the system. The USER'S MANUAL and the PROGRAMMER'S MANUAL should be supplied with each MINIGAP system. Author (GRA)

N79-12780 Duke Univ., Durham, N. C.
A DATA STRUCTURE MODEL ALLOWING CONCURRENT ACCESS Ph.D. Thesis
Bert Alton Brantley, Jr. 1978 215 p
Avail: Univ. Microfilms Order No. 7821293

General considerations of a data base are presented, followed by review of the current data base system and operating system concepts. A data structure model is then developed which allows alternation of representation without affecting logical relationships and includes multi-list structures. The model has three levels. The first level, the structure prototype, defines how a data structure is to be maintained and therefore determines both the storage requirements and manipulation times of a structure so implemented. The second level of the data structure model is the structure type definition, which associates a logical relationship to two classes of nodes, one node class becoming eligible to be the base of the structure and the other class being eligible for membership in the structure. The third level is a set of nodes having the structures as specified by the structure type. Dissert. Abstr.

N79-12792# National Technical Information Service, Springfield, Va.
DATA BASE LANGUAGE. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Aug. 1978
George W. Reimherr Sep. 1978 109 p Supersedes NTIS/PS-77/0878
(NTIS/PS-78/0977/5; NTIS/PS-77/0878) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The bibliography cites studies on query languages, data definition languages, data manipulation languages, and data element directories/dictionaries. References are made to the CODASYL standard, as well as to many other data bases. Descriptions of the data elements of data bases, applied to a variety of areas, are given. GRA

N79-12741# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
ALGORITHMS FOR REPORTING AND COUNTING GEOMETRIC INTERSECTIONS Interim Report
Jon L. Bentley and Th. Ottmann Aug. 1978 20 p refs
(Contract N00014-76-C-0370)
(AD-A058768; CMU-CS-78-135) Avail: NTIS HC A02/MF A01 CSCL 12/1

An interesting class of Geometric Intersection Problems calls for dealing with the pairwise intersections among a set of N objects in the plane. These problems arise in many applications such as printed circuit design, architectural data bases, and computer graphics. Shamos and Hoey have described a number of algorithms for detecting if any two objects in a planar set intersect. This paper extends this work by giving algorithms which count the number of such intersections and algorithms which report all such intersections. GRA

N79-16874*# Aerospace Corp., El Segundo, Calif. Advanced Programs Div.
THE DETERMINATION OF MEASURES OF SOFTWARE RELIABILITY Final Report
F. D. Maxwell and B. C. Corn Dec. 1978 118 p refs
(Contract NAS1-14392)
(NASA-CR-158960; ATR-79(7590)-1) Avail: NTIS HC A06/MF A01 CSCL 09B

Measurement of software reliability was carried out during the development of data base software for a multi-sensor tracking system. The failure ratio and failure rate were found to be consistent measures. Trend lines could be established from these measurements that provide good visualization of the progress on the job as a whole as well as on individual modules. Over one-half of the observed failures were due to factors associated with the individual run submission rather than with the code proper. Possible application of these findings for line management, project managers, functional management, and regulatory agencies is discussed. Steps for simplifying the measurement process and for use of these data in predicting operational software reliability are outlined. Author

N79-16882# Inco, Inc., McLean, Va.
STANDARD SOFTWARE BASE (SSB) RELEASE 3 Final Technical Report, 28 Aug. 1976 - 28 Feb. 1978
Thomas Trump Jul. 1978 72 p
(Contract F30602-77-C-0046)
(AD-A059647; INCO/1073-378-TR-26-D(F); RADC-TR-78-167) Avail: NTIS HC A04/MF A01 CSCL 09/2

The Standard Software Base (SSB) was developed to provide a common inventory of modular software tools with which AN/GYQ-21(V) system users could quickly and effectively develop and implement data systems unique to their site-specific requirements. The specific objectives of the SSB system include: (1) Establishment of a common standard technological software base supporting the development of applications programs, and overall implementation of AN/GYQ-21(V) systems. (2) Elimination of duplicate development efforts and shortening implementation schedules. (3) Development and delivery of comprehensive system documentation and software releases to user activities. (4) Development of a comprehensive training program to equip Air Force personnel with the knowledge required to develop mobile on-site SSB training teams. Author

N79-17882# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
MULTIDIMENSIONAL BINARY SEARCH TREES IN DATABASE APPLICATIONS Interim Report
Jon Louis Bentley 8 Sep. 1978 20 p refs
(Contract N00014-76-C-0370)
(AD-A061626; CMU-CS-78-139) Avail: NTIS HC A02/MF A01 CSCL 09/2

The multidimensional binary search tree (abbreviated k-d tree) is a data structure for storing multi-key records. This structure has been used to solve a number of problems in geometric data bases arising in statistics and data analysis. The purposes of this paper are to cast k-d trees in a database framework, to collect the results on k-d trees which have appeared since the structure was introduced, and to show how the basic data structure can be modified to facilitate implementation in large (and very large) databases. Author (GRA)

N79-17892# Sauer Computer Systems, St. Louis, Mo.
KEY/500 USER'S MANUAL
R. Gruen and A. Groh Jul. 1978 72 p
(PB-287951/8; SCS-01) Copyright. Avail: NTIS HC A04/MF A01 CSCL 09B

KEY/500 is an application development system which exceeds the capabilities of most software packages described as Data Base Management Systems. It simplifies the use of Digital Equipment Corporation's timesharing computers in the 500 series and enables the programmer analyst to quickly set up computer systems to the exact specifications of the ultimate user. Multiple indices are maintained dynamically and all alterations to its indices take place in real time. Every function of KEY/500 including IN1, a sophisticated table driven data entry routine is described. A spectrum of data retrieval techniques are presented. GRA

N79-18618 Cornell Univ., Ithaca, N. Y.
LANGUAGE-BASED ACCESS CONTROL MECHANISMS FOR SHARED DATABASES Ph.D. Thesis
Nancy Carol Eland 1978 124 p
Avail: Univ. Microfilms Order No. 7902317

Existing database management systems using these criteria are evaluated and found to be generally inadequate. ASAP is used in a simple file management system with good security features, to illustrate how a database management system using a self-contained language can be designed to satisfy our criteria. An extension to the existing version of ASAP which makes it a more suitable language for modern database applications is proposed. Several methods for enforcing access control in general purpose languages to illustrate how a database management system embedded in a host language can satisfy the criteria are analyzed. A protection class method which is based on the library mechanism of ASAP is developed. Dissert. Abstr.

N79-19729 California Univ., Irvine.
POWER EFFICIENCY, AND CORRECTNESS OF TRANSFORMATION SYSTEMS Ph.D. Thesis
Dennis Francis Kibler 1978 215 p
Avail: Univ. Microfilms Order No. 7908401

The test bed is a LISP program, SPECIALIST, which performs a limited type of source-to-source program optimization is presented. The major power of SPECIALIST lies in its ability to simplify programs when the data structure is contrained by a local predicate. SPECIALIST simplifies matrix computation programs. Transformations, without backup or user assistance, are provided, and the time complexity of an algorithm are reduced. Dissert. Abstr.

N79-20772# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
THE REVISED REPORT ON SCHEME: A DIALECT OF LISP
Guy Lewis Steele, Jr. and Gerald Jay Sussman Jan. 1978 37 p refs
(Contract N00014-75-C-0643)
(AD-A062383; AI-M-452) Avail: NTIS HC A03/MF A01 CSCL 09/2

SCHEME is a dialect of LISP. It is an expression-oriented, applicative order, interpreter-based language which allows one to manipulate programs as data. It differs from most current dialects of LISP in that it closes all lambda-expressions in the environment of their definition or declaration, rather than in the execution environment. This has the consequence that variables are normally lexically scoped, as in ALGOL. However, in contrast with ALGOL, SCHEME treats procedures as a first-class data type. They can be the values of variables, the returned values of procedures, and components of data structures. Another difference from LISP is that SCHEME is implemented in such a way that tail-recursions execute without net growth of the interpreter stack. The effect of this is that a procedure call behaves like a GOTO, and thus procedure calls can be used to implement iterations, as in PLASMA. A complete 'user manual' for the SCHEME language is given. Some features described here were not documented in the original report on SCHEME (for instance particular macros). Other features were added, changed, or deleted as our understanding of certain language issues evolved. Annotations to the manual describe the motivations for these changes. GRA

N79-21818# National Technical Information Service, Springfield, Va.

DATA BASE LANGUAGES. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Jan. 1979

Brian Carrigan Feb. 1979 65 p Supersedes NTIS/PS-78/0012
(NTIS/PS-79/0004/6; NTIS/PS-78/0012) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

Query languages, data definition languages, data manipulation languages, and data dictionary/directories were studied. References are made to the CODASYL standard, as well as to many other data bases. The data elements of data bases applied to a variety of areas are described. This updated bibliography contains 60 abstracts 20 of which are new entries to the previous edition. GRA

N79-22784# Martin Marietta Corp., Denver, Colo.

APPLICATION OF THE REPRESENTATION INDEPENDENT PROGRAMMING SYSTEM TO KNOWLEDGE MANAGEMENT Final Technical Report

C. Russell Spath and Lowell S. Schneider Dec. 1978 82 p refs
(Contract F30602-77-C-0142)
(AD-A064062; MCR-78-1404; RADC-TR-78-197) Avail: NTIS HC A05/MF A01 CSCL 09/2

Brief descriptions of the Representation Independent Programming System (RIPS) components are presented, and preliminary assignment of Knowledge Management (KW) functional requirements to these components are proposed and discussed. The majority of KM functions are found to correspond closely with RIPS concepts and present definitions. Extensions to RIPS to accomodate some KM functional requirements and current RIPS concepts that extend the KM requirements are discussed and are included in a final allocation matrix, defining the functional requirements of RIPS to satisfy KM requirements. The current status of RIPS components are discussed and estimates of time to develop a KM test-bed are provided along with a proposed schedule. Facility requirements for the development are listed and estimated performance characteristics, projected from current results, are provided. The powerful KM concepts are found to be satisfied by RIPS with few extensions and, in fact, to be enhanced beyond the explicit requirements. Implementation of the concepts in a test-bed environment is found to be feasible. Author (GRA)

N79-22783# Navy Personnel Research and Development Center, San Diego, Calif.

USER PERFORMANCE WITH A NATURAL LANGUAGE QUERY SYSTEM FOR COMMAND CONTROL Interim Report

Ramon L. Hershman, Richard T. Kelly, and Harold G. Miller Jan. 1979 54 p refs
(ZF55551019)
(AD-A064695; NPRDC-TR-79-7) Avail: NTIS HC A04/MF A01 CSCL 09/2

Natural language query systems have been developed as potential aids to command control data retrieval processes involving large data bases. One such system, LADDER (for Language Access to Distributed Data with Error Recovery), was studied in order to identify significant performance characteristics associated with its use in a Navy command control environment. Ten officers received moderate training in LADDER and subsequently employed it in a search and rescue scenario. Both system and user performance were examined. Basic patterns of usage were established, and troublesome syntactic expressions were identified. Design recommendations for the man-computer interface in command control query systems are discussed. Author (GRA)

N79-22702# Maryland Univ., College Park. Computer Science Center.

ANOTHER LOOK AT THE LONGLEY DATA SET

G. W. Stewart Dec. 1978 31 p refs
(Contract N00014-76-C-0391; Grant NSF MSC-76-03297)
(AD-A065626; TR-719) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper considers a linear regression problem involving economic data used by Longley in a study of the performance of regression programs. The data set is notoriously difficult to handle computationally. In this paper, the singular value decomposition and the QR factorization are used to show that very small perturbations in the data render it colinear, thus accounting for the computational difficulties. Another analysis, based on coefficients that bound perturbations in the regression coefficients in terms of perturbations in the columns of the data, also shows the extreme sensitivity of the problem. An analysis is also given of a perturbation index, introduced by Beaton, Rubin, and Barone to measure the sensitivity of regression problems. It is shown that the index is valid only for extremely large sample sizes and is not applicable to the Longley data set. Author (GRA)

N79-28812# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences.

FQL A FUNCTIONAL QUERY LANGUAGE Technical Report, Apr. 1978 - Mar. 1979

O. Peter Buneman and Robert E. Frankel Mar. 1979 28 p refs
(NR Proj. 049-272)
(AD-A066992; Rept-79-03-05) Avail: NTIS HC A03/MF A01 CSCL 09/2

An applicative language based upon recent ideas by John Backus has been developed. The language provides a powerful formalism for the expression of complex database queries. Though currently implemented with an interface to a CODASYL system, the language employs a sufficiently general data model that use with other database management systems is possible. This paper describes the language through a number of examples and outlines its implementation. Author (GRA)

N79-27086# Joint Publications Research Service, Arlington, Va.

PRINCIPLES OF THE CONSTRUCTION OF A NEW GENERATION OF SAPR'S

L. A. Rychkov and B. A. Kuzmin *In its* Transl. on USSR Sci. and Technol.: Phys. Sci. and Technol., No. 72 (JPRS-73663) 12 Jun. 1979 p 13-24 refs Transl. into ENGLISH from Prib. Sist. Upr. (Moscow), no. 1, Jan. 1979 p 4-7

Avail: NTIS HC A05/MF A01

The inadequacies of existing programs for designing printed card circuits are examined as well as basic trends in the development of automated design systems. Principles to be considered for the construction of more useful systems include universality, adaptability, full monitoring, interpretation of errors, system productivity, and the use of specialized data bases. The Monika system which includes a complex of design automation facilities making it possible to carry out the design process from the input of the initial information to the output of design specifications (texts, drawings, templates) is described. With Monika, the user interacts with the system by means of the assignment language control and the user-system dialog language. A.R.H.

N79-27873*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ORRC/SAIL INTERFACE CONTROL DOCUMENT FOR SAIL OFT DATA TAPES, REVISION A
May 1979 41 p
(NASA-TM-80479; IN-77-FM-007-Rev-A; JSC-12866-Rev-A) Avail: NTIS HC A03/MF A01 CSCL 09B

The formats for all orbital flight tests magnetic tape recordings produced in the Johnson Space Center Shuttle Avionics Laboratories which are required to be processed in the orbiter data reduction complex or by the mission control center network interference processor are described. M.M.M.

N79-28914# California Univ., Los Angeles. Graduate School of Management.
ON THE USE OF PRODUCTIVITY AIDS IN SYSTEM DEVELOPMENT AND MAINTENANCE
Bennet P. Lientz and E. Burton Swanson 15 Jan. 1979 23 p refs
(Contract N00014-75-C-0266; NR Proj. 049-345)
(AD-A067947; TR-79-1) Avail: NTIS HC A02/MF A01 CSCL 09/2

There exists a substantial literature on productivity aids. Software aids have been developed in areas such as testing, documentation, programming, design, and analysis. A survey of almost five hundred organizations was performed to analyze various aspects of software maintenance. A purpose of the survey was to analyze the use of various productivity aids, and to ascertain relationships between their use and maintenance effort and characteristics. The survey indicates that no productivity aid was widely employed in system development and that many productivity aids do not address perceived problem areas. Areas perceived as problems include user involvement in the application, handling user enhancements, and management concerns with resource allocation. Statistical analysis found certain tools (HIPO), automated flowcharting, data base dictionaries, and test data generators more prevalent among organizations with larger data processing budgets. Use of HIPO (automated flowcharts) was found to be more prevalent among younger (older) applications. Data base dictionaries and test data generators were found to associate with larger systems. Analysis revealed that the impact of the use of tools on maintenance effort is dominated by characteristics of size, number of reports, system development experience, and use of data base management systems. Author (GRA)

N79-28926# General Electric Co., Sunnyvale, Calif. Command and Information Systems.
SOFTWARE DATA BASELINE ANALYSIS Final Technical Report, 14 Nov. 1977 - 17 Nov. 1978
D. L. Fish and M. T. Matsumoto Mar. 1979 84 p refs
(Contract F30602-78-C-0022; AF Proj. 5581)
(AD-A068533; RADC-TR-79-67) Avail: NTIS HC A05/MF A01 CSCL 09/2

The subject report summarizes the results of an analysis of software error data supplied by the Information Sciences Division of Rome Air Development Center (RADC). These data consisted of the software problem histories of five large-scale software developments, individually collected by the development contractors and supplied to RADC. The problems were classified by a previously developed error typology. The purpose of the analysis was to investigate the existence of any consistencies in the occurrence of errors utilizing the five development efforts. The analysis included consideration of the error typology, rate of occurrence, time of occurrence, time to fix, and module size. Results of the analysis isolate methodological problems in the gathering of software error data and suggest that positive incentives be provided to development team members involved in the data collection effort. GRA

N79-29834# Computer Sciences Corp., Silver Spring, Md. System Sciences Div.
CENTRAL FLOW CONTROL SYSTEM DATA ASSEMBLER COMPONENT USER'S MANUAL Final Report
Jan. 1979 110 p refs
(Contract DOT-FA77WA-3955)
(AD-A069837; CSC/SD-78/6141; FAA-RD-79-38) Avail: NTIS HC A06/MF A01 CSCL 09/2

The data assembler (DA), which creates, updates, merges, or lists the central flow control data base, is an off-line program, and operates on air-carrier flight schedules, airport data, airline codes, aircraft data, ARTCC data, zone data, and general-aviation data. The primary inputs to DA are Official Airline Guide data. Processing is controlled by user option specification and DA validates all input data and provides its own internal housekeeping facilities. Procedures for exercising these functions are described. A.R.H.

N79-32016# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN FOR AN AUTOMATED STATUS ACCOUNTING SYSTEM FOR SOFTWARE CONFIGURATION MANAGEMENT M.S. Thesis
Alexander Schuster Mar. 1979 244 p refs
(AD-A069300; AFIT/GCS/EE/79-2) Avail: NTIS HC A11/MF A01 CSCL 09/2

This report documents a design effort for an automated system to record and report the configuration status of software for Air Force embedded computer systems. The work included requirements analysis, software design, and data-base design. Because of the flexibility given to program managers in tailoring their reporting requirements and in selecting the data integrator, only the requirements of a single AFSC program office were presented in detail. However, the requirements of other offices were considered as well. Current software engineering techniques were used to derive the design. They are highly recommended for use on other software development projects. GRA

N79-32022# Oak Ridge Gaseous Diffusion Plant, Tenn.
DESCRIPTION OF DATA ENTRY FOR AUTOMATED COST ESTIMATING
N. H. VanWie Apr. 1979 45 p refs
(Contract W-7405-eng-26)
(K/CSD/TM-29) Avail: NTIS HC A03/MF A01

A series of computer programs was developed to aid in the computation and reporting of a project cost estimate. These programs are operative on any project, regardless of scale, as long as a minimal set of rules for preparation of the data base is followed. The data base for a project is subdivided into four types of data or files: a title file, a front-end file, a file of cost sheets for the base cost estimate, and a file of cost items with their schedules for the time-phased estimate. The data requirements formating and specifications for preparation of these files to enable computation are described. Examples are presented and alternative approaches to accomplish an end result are explained. DOE

N79-32067 Pennsylvania Univ., Philadelphia.
COOPERATIVE RESPONSES FROM A PORTABLE NATURAL LANGUAGE DATA BASE QUERY SYSTEM Ph.D. Thesis
Samuel Jerrold Kaplan 1979 295 p
Avail: Univ. Microfilms Order No. 7919473

A limited theory of cooperative behavior in question answering is presented and applied in a query system that is capable of various types of direct and indirect responses. Problems in the representation of the knowledge required to produce such responses are explored. The implementation of the system illustrates that a data base (DB), a DB scheme, and a suitably encoded lexicon are sufficient sources of domain specific knowledge to provide appropriate responses to a habitable class of simple natural language questions. As a result, the system achieves a high degree of portability to new DB domains. Transcripts of the program's behavior on two radically different DBs are presented and analyzed. In addition, issues in the production of useful paraphrases, effective error handling, transparency of DB update, and efficient path finding in DB schemas are discussed. Dissert. Abstr.

N79-32081# Naval Intelligence Processing System Support Activity, Alexandria, Va.

STRUCTURED PROGRAMMING IN A DATABASE ENVIRONMENT
L. E. Towner 24 May 1979 19 p
(AD-A070270) Avail: NTIS HC A02/MF A01 CSCL 09/2

Structured programming has been actively endorsed by proponents of improved data processing management techniques for several years. Many examples of reduced costs and improved project control have been cited. Unfortunately, applications of these techniques have failed to meet the expectation in many cases. The advent of the database management system (DBMS) as a major support tool in the data processing picture has also resulted in mixed results, often falling far short of the pre-installation build-up. Frequently this lack of DBMS achievement can be traced to inadequate control of the applications projects which will utilize the DBMS. This paper describes the use of structured techniques, both analysis and programming, in overcoming the problems of database applications software support. Structured techniques are particularly applicable to the database environment because of the centralizing of procedural and logical programming functions around the DBMS software.
GRA

N79-33891# Computer Sciences Corp., Silver Spring, Md. System Sciences Div.
CENTRAL FLOW CONTROL DATA REDUCTION AND ANALYSIS COMPONENT USER'S MANUAL Final Report
Jan. 1979 91 p
(Contract DOT-FA77WA-3955)
(AD-A069893; FAA-RD-79-40; CSC/SD-78/6153) Avail: NTIS HC A05/MF A01 CSCL 09/2

The functions of the data reduction and analysis (RA) programs and the procedures required to exercise them are described. The RA is comprised of four off-line analysis programs: (1) the archive log queue (ALQ) tape filter program; (2) the ALQ filtered data report generator program; (3) the system analysis recording dump program; and (4) the data base analysis program. The programs enable evaluation of system performance and system load characteristics, and provide important aids for analysis. K.L.

N80-11808*# Science Applications, Inc., Huntsville, Ala.
NASA SOFTWARE SPECIFICATION AND EVALUATION SYSTEM DESIGN Final Report
31 Oct. 1979 20 p
(Contract NAS8-32526)
(NASA-CR-161335; SAI-80-743-HU) Avail: NTIS HC A02/MF A01 CSCL 09B

The Software Specification and Evaluation System (SSES) manager's guide is presented along with the NSSC-2 computer brochure. Development, evaluation, and modification of the SSES are summarized.
K.L.

N80-11817# California Univ., Livermore. Lawrence Livermore Lab.
FUTURE TRENDS IN DATA BASE SOFTWARE
S. E. Jones 1979 16 p refs Presented at 20th AESOP Conf., Gatlinberg, Tenn., 24 Apr. 1979
(Contract W-7405-eng-48)
(UCRL-82619; Conf-790431-2) Avail: NTIS HC A02/MF A01

In the 1970's, the Data Base Management System (DBMS) became a major software component in most commercial computing facilities, and is now becoming more widely used in scientific computing. This paper assesses the trends in DBMS research to infer the type of software that will be available in coming years. The very exciting area of data management functions implemented in hardware is only mentioned briefly. The relational model is discussed because much of the current research is based on this model and its terminology. While the relational approach is not necessarily the wave of the future, its impact is being and will be felt.
DOE

N80-12788# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A PARAMETRIC MANAGEMENT TOOL FOR ESTIMATING SIMULATOR SOFTWARE SIZE M.S. Thesis
Gregory N. Frey and Kenneth L. Wildung Jun. 1979 201 p refs
(AD-A073015; AFIT-LSSR-4-79A) Avail: NTIS HC A10/MF A01 CSCL 09/2

This research investigated the causes of escalating software costs relative to Aircrew Training Devices (simulators) and resulted in a software sizing tool useful in reversing the cost growth trend. The hypothesis was that a collective software sizing estimate, aggregated and standardized at the functional level, would provide a more reliable estimate of simulator software size. Investigation disclosed that the heuristic sizing techniques being used were inadequate. There was no organized empirical data-base to support a formalized software sizing process. A software management model called SIMSIZ, including a supporting data-base, was designed and developed. The model's primary function is to assist software engineers in making realistic evaluations of the size of contractor's proposed software packages. It was concluded that a major cause of software program delays has been a growth trend in software size during program development. SIMSIZ has demonstrated that several software projects under development are undersized. The researchers recommend establishing a requirement to standardize simulator software development and reporting at the functional level. GRA

N80-13816*# Lockheed Electronics Co., Houston, Tex.
AS-BUILT DESIGN SPECIFICATION FOR CAMS DEVELOPMENT DOT DATA SYSTEM (CDDDS)
Oscar Wehmanen Sep. 1979 159 p ref
(Contract NAS9-15800)
(NASA-CR-160395; LEC-14055; JSC-16253) Avail: NTIS HC A08/MF A01 CSCL 09B

The CAMS development dot data system is described. Listings and flow charts of the eight programs used to maintain the data base and the 15 subroutines used in FORTRAN programs to process the data are presented.
K.L.

N80-17723 Stanford Univ., Calif.
PERFORMANCE OF UPDATE ALGORITHMS FOR REPLICATED DATA IN A DISTRIBUTED DATABASE Ph.D. Thesis
Hector Garcia-Molina 1979 319 p
Avail: Univ. Microfilms Order No. 8001920

Studies are presented on the performance of update algorithms for replicated data in a distributed database. In doing so, several other related issues are investigated. A simple model of a distributed database which is suitable for studying updates and concurrency control are presented. A performance model and a set of parameters which represent the most importance performance features of a distributed database are developed.
Dissert. Abstr.

N80-17730# Research Inst. of National Defence, Linkoeping (Sweden).
DIALOG WITH A COMPUTER FOR TEXT EDITING AND DATA BASE HANDLING [DIALOG MED EN DATOR FOER TEXTREDIGERING OCH DATABASHANTERING]
Per Thernquist Feb. 1979 84 p In SWEDISH
(FOA-C-20291-X7/H8) Avail: NTIS HC A05/MF A01

Material taken from a course in basic computer techniques is presented with reference to IBM 370 and DEC 10 systems. Use of an interactive terminal is discussed with examples of a text editing system called SOS and a data base management system 1022, written for the DEC 10. Practical exercises are given.
Author (ESA)

N80-18746 Florida Univ., Gainesville.
A GENERALIZED SYSTEM FOR APPLICATION PROGRAM CONVERSION TO ACCOUNT FOR DATABASE SEMANTIC CHANGES: DESIGN AND PROTOTYPE IMPLEMENTATION Ph.D. Thesis
Herman Lam 1979 201 p
Avail: Univ. Microfilms Order No. 8002872

The effect on the application programs as a result of the database changes in the associated database was studied. A methodology of program analysis and conversion to account for the database changes is presented. Topics covered include: (1) the methodology; (2) a model of application program conversion; (3) an analysis of access patterns in the context of a semantic data model; (4) the possible meaningful semantic changes and their transformation rules for program conversion: (5) prototype implementation of the conversion phase; (6) the major interfaces to the conversion phase; and (7) the problems for future investigation. Dissert. Abstr.

N80-19867# University of Southern California, Marina del Rey. Information Sciences Inst.
A FORMAL DEFINITION OF AMDL
Peter W. Alfon Oct. 1979 79 p refs
(Contracts F30602-78-C-0008; DAHC15-72-C-0308)
(AD-A078035; ISI/RR-79-78) Avail: NTIS HC A05/MF A01 CSCL 09/2

Since the introduction of ISP, the use of hardware description languages (HDLs) has increased dramatically. Used originally to describe at the programming level the instruction sets of digital computers, hardware descriptions are now being used in applications such as design automation, emulation, compiler generation, and program verification - to name only a few. This surge of activity has put the existing HDLs to the thorough test, with each application area making its own set of demands on the languages. One common demand, however, is for a precise definition of the HDLs themselves. AMDL is an abstract form of the hardware description language ISPS. This report presents a formal definition of AMDL, using the techniques of denotational semantics as developed by Scott and Strachey. AMDL includes some nonstandard control and data structures which are easily handled by this definitional method. This report assumes familiarity with descriptive denotational semantics. GRA

N80-23041# Research Inst. of National Defence, Stockholm (Sweden).
DESIGN SPECIFICATION FOR DATALAB: A SYSTEM FOR DATA ANALYSIS BASED ON RELATIONAL MODEL OF DATA
Stefan Arnborg, Eva Elvers, and Per Svensson Nov. 1979 232 p refs
(FOA-C-20326-D8) Avail: NTIS HC A11/MF A01

The design documentation for a proposed interactive program system, Datalab, intended for data analysis applications in science, technology, and management is presented. The kernel of the system is a relational database subsystem permitting the evaluation of queries expressed in a relational algebra query language. Onto this kernel are added several subsystems which serve to enhance the analytic power of the system, to simplify its use, and to ensure the security of its database. The system is functionally extensible, in the sense that additions to the standard set of application programs can be made by a programmer user. Author (ESA)

N80-24012# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
CONCURRENT MANIPULATION OF BINARY TREES. REVISION Interim Report
H. T. Kung and Philip L. Lehman Sep. 1979 48 p refs Revised
(Contract N00014-76-C-0370; Grant NSF MCS-78-23676)
(AD-A081443; CMU-CS-79-145-Rev) Avail: NTIS HC A03/MF A01 CSCL 09/2

The concurrent manipulation of a binary search tree is considered in this paper. The systems presented can support any number of concurrent processes which perform searching, insertion, deletion, and rotation(reorganization) on the tree, but allow any process to lock only a constant number of nodes at any time. Also, in the systems, searches are essentially never blocked. The concurrency control techniques introduced in the paper include the use of special nodes and pointers to redirect searches, and the use of copies of sections of the tree to introduce many changes simultaneously and therefore avoid unpredictable interleaving. Methods developed in this paper may provide new insights to other problems in the area of concurrent database manipulation. GRA

N80-27111*# Washington Univ., St. Louis, Mo. McDonnell Center for Space Sciences.
BIRP: SOFTWARE FOR INTERACTIVE SEARCH AND RETRIEVAL OF IMAGE ENGINEERING DATA
Raymond E. Arvidson, Lawrence K. Bolef, Edward A. Guinness, and Peter Norberg Jul. 1980 76 p
(Grant NsG-7087)
(NASA-CR-3299; SL-4) Avail: NTIS HC A05/MF A01 CSCL 09B

Better Image Retrieval Programs (BIRP), a set of programs to interactively sort through and to display a database, such as engineering data for images acquired by spacecraft is described. An overview of the philosophy of BIRP design, the structure of BIRP data files, and examples that illustrate the capabilities of the software are provided. M.G.

N80-27121# General Electric Co., Arlington, Va.
A MATCHED PROJECT EVALUATION OF MODERN PROGRAMMING PRACTICES. VOLUME 2: SCIENTIFIC REPORT ON THE ASTROS PLAN Interim Report, 1 Sep. 1977 - 30 Nov. 1979
Phil Milliman and Bill Curtis RADC Griffiss AFB, N.Y. Feb. 1980 123 p refs 2 Vol.
(Contract F30602-77-C-0194; AF Proj. 2528)
(AD-A083513; DOC-791SP006; RADC-TR-80-6-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 09/2

A detailed account of the theories and analyses underlying the results of a quasi-experimental comparison of the Launch Support Data Base (LSDB) developed under the guidelines of the ASTROS Plan and the Data Analysis Processor (DAP) developed using conventional techniques is presented. The performance of the LSDB Project was comparable to that of similar sized software development projects on numerous criteria. The amount of code produced per man month was typical of conventional development efforts. Nevertheless, the performance of the LSDB Project was superior to that of the DAP Project. The benefits of the modern programming practices employed on the LSDB Project were limited by the constraints of environmental factors such as computer access and turnaround time. J.M.S.

N80-28073# Lockheed Missiles and Space Co., Palo Alto, Calif. Applied Mechanics Lab.
INTERACTIVE NONLINEAR STRUCTURAL ANALYSIS. A REVIEW OF THE GIFTS-STAGS UNION Final Report
31 Mar. 1980 24 p refs
(Contract N00014-79-C-0070)
(AD-A084209; LMSC-D686137) Avail: NTIS HC A02/MF A01 CSCL 09/2

The three primary tasks were: (1) the GIFTS and STAGS finite element programs were to be data-base linked permitting GIFTS graphics-interactive pre- and post-processing of STAGS batch nonlinear structural analyses; (2) interactive software was to be introduced to facilitate convenient operation of the software assembly; and (3) the resulting integrated system was to be verified and documented. The corresponding results: (1) it is now possible to utilize GIFTS pre-and post-processing for a limited variety of STAGS analyses; (2) the software assembly is accessible to the user within a totally conversational environment in which both batch and interactive phases of analysis are prepared, managed and data-base monitored; and (3) current capabilities have been verified with respect to a modest selection of sample problems. GRA

N80-28071# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
TOWARDS A THEORY FOR ABSTRACT DATA TYPES Ph.D. Thesis
Deepak Kapur Jun. 1980 255 p refs
(Contract N00014-75-C-0661; Grant NSF MCS-74-21892)
(AD-A085877; MIT/LCS/TR-237) Avail: NTIS HC A12/MF A01 CSCL 09/2

A rigorous framework for studying immutable data types having nondeterministic operations and operations exhibiting exceptional behavior is developed. The framework embodies the view of a data type taken in programming languages, and supports hierarchical and modular structure among data types. The central notion in this framework is the definition of a data type. An algebraic and behavioral approach for defining a data type is developed which focuses on the input-output behavior of a data type as observed through its operations. The definition of a data type abstracts from the representational structure of its values as well as from the multiple representations of the values for any representational structure. A hierarchical specification language for data types is proposed. A deductive system based on first order multi-sorted predicate calculus with identity is developed for abstract data types. A correctness criterion is proposed for an implementation coded in a programming language with respect to a specification. It is defined as a relation between the semantics of an implementation and the semantics of a specification. It does not require a correct implementation to have the maximum amount of nondeterminism specified by a specification. A methodology for proving correctness of an implementation is developed which embodies the correctness criterion. GRA

N80-32118 Pennsylvania Univ., Philadelphia.
AUTOMATIC TRANSACTION DECOMPOSITION IN A DISTRIBUTED CODASYL PROTOTYPE SYSTEM Ph.D. Thesis
Frank Germano, Jr. 1980 243 p
Avail: Univ. Microfilms Order No. 8018547

Alternative distributed database management systems (DDBMS) architectures for the distribution of CODASYL-like structures were investigated and a prototype distributed CODASYL architecture, DSEED was defined. To provide acceptable performance, the use of a high level data language beyond the DML level and beyond the set level is indicated. Towards this end, the syntax and semantics of a (FOR EACH) data language, SEEDFe, is defined. The automatic decomposition using a preprocessor of SEEDFE programs into a front end control task and subordinate back end tasks is described. A global view mechanism, coupled with this decomposition process, provides geographic transparency for the application, programmer. This mechanism, whose operation is controlled by a global schema defined by data definition facilities, guides the mapping of multiple, underlying local views to a global database view. Since some sets in the global view can have owner and member records which are not collocated, the notion of a distributed set is defined and a possible implementation proposed.
Dissert. Abstr.

N80-32123# National Technical Information Service, Springfield, Va.
COMPUTER SOFTWARE RELIABILITY. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, Jul. 1977 - May 1980
Brian Carrigan Jun. 1980 269 p Supersedes NTIS/PS-79/087; NTIS/PS-78/0843
(PB80-811797; NTIS/PS-79/0871; NTIS/PS-78/0843) Avail: NTIS HC $30.00/MF $30.00 CSCL 09B

A bibliography containing 261 abstracts addressing computer software reliability modeling, software verification, and the evaluation of test tools for the measurement of software correctness is presented. General discussions are included. GRA

62 COMPUTER SYSTEMS

Includes computer networks

A75-39492 # **The concept of an interactive graphic design system /IGDS/ with distributed computing.** C. W. Klomp, R. A. Gern, and W. W. Braithwaite (Boeing Commercial Airplane Co., Seattle, Wash.). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Meeting, Los Angeles, Calif., Aug. 4-7, 1975, Paper 75-966.* 9 p. 7 refs.

The subject system is a distributed two- and three-dimensional interactive graphics system. Its prime elements are minicomputer subsystems on which design construction, editing, manipulation, and verification are performed in support of the aerospace vehicle design process. These subsystems are tailored to specific departmental requirements and, hence, are configured to support explicit needs. Such configurating permits the incorporation of whatever graphic medium is required (storage tubes, refresh tubes, flatbed, or drum plotters). Each subsystem represents a node in a network consisting of many such graphic subsystems, nongraphic subsystems, and a number of large-scale mainframes for providing additional processing power and the management of shared data bases. This paper explains why this approach was chosen rather than an approach utilizing a single mainframe on which all activities are performed. In addition, a number of applications are presented and the inherent flexibility of the approach, as well as expansion or retraction capabilities, are discussed. (Author)

A75-44189 **The protection of information in computer systems.** J. H. Saltzer and M. D. Schroeder (MIT, Cambridge, Mass.). *IEEE, Proceedings*, vol. 63, Sept. 1975, p. 1278-1308. 100 refs.

This tutorial paper explores the mechanics of protecting computer-stored information from unauthorized use or modification. It concentrates on those architectural structures - whether hardware or software - that are necessary to support information protection. The paper develops in three main sections. Section I describes desired functions, design principles, and examples of elementary protection and authentication mechanisms. Any reader familiar with computers should find the first section to be reasonably accessible. Section II requires some familiarity with descriptor-based computer architecture. It examines in depth the principles of modern protection architectures and the relation between capability systems and access control list systems, and ends with a brief analysis of protected subsystems and protected objects. The reader who is dismayed by either the prerequisites or the level of detail in the second section may wish to skip to Section III, which reviews the state of the art and current research projects and provides suggestions for further reading. (Author)

A76-28402 **The Information Process System Simulator - IPSS.** T. G. DeLutis (Ohio State University, Columbus, Ohio). In: Annual Simulation Symposium, 9th, Tampa, Fla., March 17-19, 1976, Record of Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 31-46. NSF Grant No. G-36822.

The Information Processing System Simulator (IPSS) is a special-purpose language and discrete event simulator. It has been developed to investigate the behavior of complex computer-based information systems. IPSS's language features facilitate the modeler's ability to identify and describe an information system's (1) application software, (2) hardware configuration, (3) data base, (4) operating system resource allocation and task management software, and (5) volume of user activity. It has been designed to allow the investigation of a wide spectrum of hardware and software components and system environments. The purpose of this paper is to discuss the underlying methodology for IPSS and to describe its salient features. (Author)

A76-30344 **A model for distributed computer system design.** S.-K. Chang (Illinois, University, Chicago, Ill.). *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-6, May 1976, p. 344-359. 156 refs.

A model of a distributed computer system for transaction processing is described. The system configuration problem is formulated as a problem of deciding transaction allocation, routing, processor allocation, and line allocation to satisfy certain performance requirements and design constraints. A heuristic design procedure for hierarchical computer systems is described. Based upon this design procedure, an experimental interactive configurator for distributed computer system design is implemented in APL. Topics for further investigation are discussed. (Author)

A76-44347 # **System for automating radiophysics experiments on the basis of universal computers of a computer center (Sistema avtomatizatsii radiofizicheskikh issledovanii na osnove universal'nykh EVM vychislitel'nogo tsentra).** S. S. Kolosov, Iu. I. Leonov, L. N. Litvinenko, and T. M. Chernysheva (Akademiia Nauk Ukrainskoi SSR, Institut Radiofiziki i Elektroniki, Kharkov, Ukrainian SSR). *Upravliaiushchie Sistemy i Mashiny*, May-June 1976, p. 103-106. In Russian.

The paper describes a computing facility for automatic control of radiophysics experiments that incorporates the use of an M-222 computer as central processor and the Minsk-2 computer as buffer processor. Interfacing conditions between system blocks and interrupt procedures are described. P.T.H.

A78-47226 **Federated systems using microprocessor networks - Distributed data management.** D. E. Katter, Jr. (IBM Corp., Federal Systems Div., Owego, N.Y.). In: Engineering in a changing economy; Proceedings of the Southeast Region 3 Conference, Clemson, S.C., April 5-7, 1978. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 177, 178. 15 refs.

This paper examines federated systems using microprocessor networks from the aspects of management and sharing of data. First, baseline definitions are stated, followed by a review of distributed network requirements. Current developments, both for micro and miniprocessors, are analyzed for their distribution of functions and attendant inter-process communication. Finally, the need for decentralized data bases and distributed processing is delineated and evolutionary system solutions are compared. (Author)

A78-26184 * # **An image based information system - Architecture for correlating satellite and topological data bases.** N. A. Bryant and A. L. Zobrist (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). In: Data Management Symposium, Huntsville, Ala., October 18, 19, 1977, Proceedings. Huntsville, Ala., University of Alabama, 1978, p. 135-142. 14 refs.

The paper describes the development of an image based information system and its use to process a Landsat thematic map showing land use or land cover in conjunction with a census tract polygon file to produce a tabulation of land use acreages per census tract. The system permits the efficient cross-tabulation of two or more geo-coded data sets, thereby setting the stage for the practical implementation of models of diffusion processes or cellular transformation. Characteristics of geographic information systems are considered, and functional requirements, such as data management, geocoding, image data management, and data analysis are discussed. The system is described, and the potentialities of its use are examined. M.L.

A78-26186 # **The ASTRO relational data base management system.** H. Rubin, M. Anshel, J. Geller, C. Hamlin, D. Schilling, and S. Wecker. In: Data Management Symposium, Huntsville, Ala., October 18, 19, 1977, Proceedings. Huntsville, Ala., University of Alabama, 1978, p. 153-167.

The paper discusses design criteria used by Project ASTRO in designing a data base management system for Landsat data. The design criteria which led to the adoption of a relational data base management systems model are that: (1) the system must be capable of responding to queries whose logical structure was not foreseen at the time the system was constructed; (2) the system must exhibit data independence, in which user-determined changes in query structures, data storage, and output products can be installed without system modification; (3) the system must have a capacity for handling grid-cell and polygonal georeferenced data in conjunction with optical and tabular data types; (4) the system must have the ability to modify, update, renew, and delete data, with assurance that specified logical criteria are met; (5) the system must have the ability to perform operations while maintaining several levels of system security; and (6) the system must have flexibility in data storage protocols. M.L.

A78-39100 **Microwave Engineering Analysis System for the Federal Communications Commission.** G. L. Sarver (Federal Communications Commission, Office of the Chief Engineer, Washington, D.C.). In: Electromagnetic compatibility; Proceedings of the Second Symposium and Technical Exhibition, Montreux, Switzerland, June 28-30, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 293-298.

To more effectively fulfill its responsibilities in the management of the nongovernment frequency spectrum, the Federal Communications Commission is developing a Microwave Engineering Analysis System (MEANS). This is an automated system employing computer techniques and an engineering data base consisting of four separate but interrelated files including a digitized antenna pattern envelope file and a digitized terrain elevation file. The analysis capability includes a statistical package to provide microwave growth and density information by area, frequency, type of radio service, and licensee; and a carrier-to-interference model based on free space path loss. The paper examines these capabilities, the status of the system, and future plans. (Author)

A79-11483 * **An interactive computer approach to performing resource analysis for a multi-resource/multi-project problem.** R. A. Schlagheck (NASA, Marshall Space Flight Center, Huntsville, Ala.). In: Winter Simulation Conference, Gaithersburg, Md., December 5-7, 1977, Proceedings. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 710-720. 8 refs.

New planning techniques and supporting computer tools are needed for the optimization of resources and costs for space transportation and payload systems. Heavy emphasis on cost effective utilization of resources has caused NASA program planners to look at the impact of various independent variables that affect procurement buying. A description is presented of a category of resource planning which deals with Spacelab inventory procurement analysis. Spacelab is a joint payload project between NASA and the European Space Agency and will be flown aboard the Space Shuttle starting in 1980. In order to respond rapidly to the various procurement planning exercises, a system was built that could perform resource analysis in a quick and efficient manner. This system is known as the Interactive Resource Utilization Program (IRUP). Attention is given to aspects of problem definition, an IRUP system description, questions of data base entry, the approach used for project scheduling, and problems of resource allocation. G.R.

A79-22830 **Requirements for management of aerospace engineering data.** R. E. Miller, Jr., J. W. Southall, and S. O. Wahlstrom (Boeing Commercial Airplane Co., Seattle, Wash.). In: Trends in computerized structural analysis and synthesis; Proceedings of the Symposium, Washington, D.C., October 30-November 1, 1978. Oxford and Elmsford, N.Y., Pergamon Press, 1978, p. 45-52.

The solution to the data handling problem in the aerospace industry is to use computers for total management of the engineering design information. It can be expected that this will produce productivity benefits comparable to those achieved by using the arithmetic computational power of the computers. In an investigation of the current situation it is found that two primary deficiencies exist in applying commercially available data base management systems in the development of engineering data bases. First, it is necessary that scientific data types be accommodated; second, the system must support a high-level partitioning of data bases such that a global view of data is presented but with local administrative support provided for definition and change control. G.R.

A79-22831 **Database management in scientific computing. I - General description.** C. A. Felippa (Lockheed Structures Laboratory, Palo Alto, Calif.). In: Trends in computerized structural analysis and synthesis; Proceedings of the Symposium, Washington, D.C., October 30-November 1, 1978. Oxford and Elmsford, N.Y., Pergamon Press, 1978, p. 53-61. 11 refs. Research supported by the Lockheed Missiles and Space Co.

A review is conducted regarding the organization and functional operation of scientific databases, giving particular attention to the utilization of the involved techniques for the assembly of large-scale modular programs and integrated program networks. A general overview of trends in scientific data management is provided. The presentation level is aimed to the nonspecialist who is nevertheless aware of current progress in the field of data management technology. It is shown that centralized data management is becoming an increasingly important part of large-scale computing. It is pointed out that scientific data management differs in many respects from business data management. The definition and classification of data structures arising in scientific computation are discussed and description is given of the approaches used in the implementation of a multilevel data management system that handles such structures. G.R.

A79-51708 # **Boeing's CAD/CAM integrated information network.** W. W. Braithwaite (Boeing Commercial Airplane Co., Seattle, Wash.). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Meeting, New York, N.Y., Aug. 20-22, 1979, Paper 79-1847.* 8 p. 5 refs.

This paper discusses elements of the heterogeneous computer environment that most often exist in the aerospace industry. An approach used by The Boeing Company to enable the exchange and sharing of data between systems in this type of environment is described. This approach utilizes globally shared data bases for providing control and security on data moving between the interfaced systems. The approach also relies on standard formats for communicating and storing data that is intended to be used by the systems of this environment. The technical approach used to make possible the interfacing of such unlike systems, and some concepts employed by the data management system are described. (Author)

A80-22402 # **AIDS - An Advanced Integrated Data System concept.** D. W. Keller and G. G. Frippel (General Electric Co., Space Div., Valley Forge, Pa.). In: International Symposium on Remote Sensing of Environment, 13th, Ann Arbor, Mich., April 23-27, 1979, Proceedings. Volume 1. Ann Arbor, Mich., Environmental Research Institute of Michigan, 1979, p. 455-462.

The paper examines the broad requirements which applications users may plan upon future data systems. In addition, guidelines and a concept for a multiaccess, multidata base system are evolved. It is demonstrated that the system enables users of remote-sensed data to readily obtain their specific data subsets through a transparent system from varied data bases which are minimally affected by the system. In addition, the system is shown to perform various functions on the data such as map projection translations and various levels of preprocessing. M.E.P.

A80-35625 **Queueing analysis of global locking synchronization schemes for multicopy databases.** C.-H. Lee (Syracuse University, Syracuse, N.Y.). *IEEE Transactions on Computers,* vol. C-29, May 1980, p. 371-384. 23 refs. NSF Grant No. ENG-77-08192; Contract No. F30602-75-C-0121.

The Network Semaphore scheme, Hopping Permit scheme, and Adaptive Hopping Permit scheme which can serialize the transactions on a multicopy distributed database are studied. Analytic models of the schemes are developed and verified by simulation. Performance criteria, such as average response time, network traffic impact, sensitivity to network increase, and sensitivity to arrival load fluctuations are also derived and verified. V.T.

A80-38310 **Architecture of future data base management systems (Architektur zukünftiger Datenbank-Management-Systeme).** E. Falkenberg (Siemens AG, Forschungslaboratorien, Munich, West Germany). *Siemens Forschungs- und Entwicklungsberichte,* vol. 9, no. 3, 1980, p. 132-137. 36 refs. In German.

Various approaches to the architecture of future data base management systems are discussed. Attention is given to the primary objectives of qualitative improvements over conventional systems such as greater data base flexibility with respect to changing requirements and greater data reliability and integrity. It is shown that these improvements are realized by introducing appropriate methods of information analysis and by strictly subdividing the data base design process into three steps. Languages suitable for this method of data base design as well as for user oriented data manipulation are surveyed. Finally, consideration is given to the impact of such methods and languages on the structure of data base management systems. M.E.P.

A80-42236 # **Gas turbine information and control system.** D. Johnson (General Electric Co., Schenectady, N.Y.). *American Society of Mechanical Engineers, Gas Turbine Conference and Products Show, New Orleans, La., Mar. 10-13, 1980, Paper 80-GT-120.* 6 p. Members, $1.50; nonmembers, $3.00.

A distributed microcomputer system is being developed so that eight gas turbine generators can communicate over simple serial 'party' cables to computers located in a central control room. There, the Station Operator's Console gives an operator full control over the turbines, while presenting status and annunciator information on two CRTs. Redundant microcomputers inside this console drive two 'party' cables for improved reliability. These microcomputers interface through telemetry equipment to the system dispatch center 80 Km from the turbine site, completing a command sequence for eight turbines in 2.5 sec. When the system is not processing commands, it collects data for the maintenance minicomputer. Over 200 signals from each turbine generator are used to create a significant data base on dual disk drives. The maintenance computer generates several logs, condition analyses and plots to support diagnostic and maintenance message. (Author)

N75-12663# Kernforschungszentrum, Karlsruhe (West Germany). Inst. fuer Datenverarbeitung in der Technik.
COORDINATION OF CRITICAL ACCESS TO DISTRIBUTED DATABANKS IN COMPUTER NETWORKS BASED ON DECENTRALIZED CONTROL
E. Holler Apr. 1974 112 p refs In GERMAN
(KFK-1967) Avail: AEC Depository Libraries HC $8.75

This report presents several solutions to the coordination problem, applying a decentralized control mechanism. The different solutions are compared relative to their efficiency by means of experiments using a computer network simulation model. NSA

N75-22005# Mound Lab., Miamisburg, Ohio.
CASE STUDY: MANUFACTURING DATA BASE STRUCTURES
E. Depew, J. Gorden, and L. Karcher 7 Nov. 1974 35 p refs
(Contract AT-33-1-GEN-53)
(MLM-2189(OP)) Avail: NTIS HC $3.75

The use of the COPICS system as a physical data base design guide at Mound Laboratory is described. The way in which the data bases can be extended and redefined by logical views and user integration problems are discussed. The application established four physical data bases: warehouse, vendor, current purchase order, and purchase order history. NSA

N75-22006# Oak Ridge National Lab., Tenn.
LISTING OF ORCHIS DATA BASES
R. Slusher and A. A. Brooks Dec. 1974 55 p refs
(Contract W-7405-eng-26)
(UCCND-CSD-INF-14) Avail: NTIS HC $[illegible].25

A listing and indices are presented to the several data bases that were processed by the ORCHIS system and documented with the computing applications department by the user. It is expected that the report will make the existence of the data bases known to potential UCC-ND users, and prompt other data base holders to submit documentation of their data bases for inclusion in future listings. A current version of this data is mounted on-line for searching with ORLOOK. NSA

N75-29838# Informatique Internationale S.A., Nancy Saint Nicolas (France).
STUDY OF A SCIENTIFIC DATA BASE Final Report
A. Bourdais Jun. 1974 123 p
(Contract ESOC-589/73-AR)
(ESRO-CR(P)-607) Avail: NTIS HC $5.25

A scientific data base was investigated for gathering data from various satellites, stations, sounding rockets, and balloons in order to classify and structure them for easier use. The definition of a scientific data base adapted to ESOC needs, the organization of the data, and orientation of the access means and principles of use are discussed. The characteristics of the data in the data base are described as well as the data input procedure. Different access means to the base data are described from the users point of view, and computer programming specifications are given. ESRO

N75-28720# Gesellschaft fuer Mathematik und Datenverarbeitung, Bonn (West Germany). Abteilung fuer Behoerdliche DV-Systeme.
STRUCTURE AND EFFICIENCY OF DATA BANK SYSTEMS: COLLECTION AND ANALYSIS OF USER REQUIREMENTS [STRUKTUR UND LEISTUNGSUMFANG VON DATENBANKSYSTEMEN, SAMMLUNG UND ANALYSE VON BENUTZERVORSTELLUNGEN]
K. Supper Mar. 1974 157 p refs In GERMAN
Avail: NTIS HC $6.25

A survey was conducted of user requirements with regard to data bank systems. A questionnaire was developed based on existing systems, and about 100 were sent to present or potential users of data banks. Replies were received from 50% of the addressees (most of them government authorities), and an evaluation of the requirements is presented, classified as follows: a total data bank system, a pure data base management system, an extended data base management system, and a documentation system. ESRO

N76-24958# National Physical Lab., Teddington (England). Div. of Numerical Analysis and Computing.
AN EXPERIMENTAL DATA BASE FOR COMPUTER PERFORMANCE INFORMATION
P. Verstege and B. A. Wichmann Nov. 1975 83 p refs
(NPL-NAC-62) Avail: NTIS HC $5.00

An experimental data base was constructed to hold performance data. The data consists of the time taken to execute processor limited jobs written in high level machine-independent languages. The data base, the information inserted, and the analysis methods used to utilize the information are described. Author (ESA)

N76-30888# RAND Corp., Santa Monica, Calif.
COST IMPLICATIONS OF PRIVACY PROTECTION IN DATABANK SYSTEMS
Rein Turn Apr. 1975 27 p refs
(AD-A022186; P-5321) Avail: NTIS CSCL 09/2

In the context of personal information data bank systems, the term privacy is being used to represent a set of rights relative to personal information of an individual data subject on whom identifiable personal data are being maintained in a data bank, regarding the collection, storage, processing, dissemination, and use of information on his personal attributes and activities. The costs of implementing privacy protection requirements in personal information data bank systems comprise the initial cost of setting up the protection system, and the recurrent operation costs. Legislation is now pending in the U.S. and other countries, on national as well as local levels, to codify various rights that individual citizens have relative to personal information stored on them in computerized data bank systems. J.A.M.

N76-32998# California Univ., Livermore. Lawrence Livermore Lab.
STATIC TOOLS FOR THE ANALYSIS OF OPERATING SYSTEM SECURITY
Jeffrey C. Huskamp, W. G. Frickel, and D. A. Webb 30 Dec. 1975 23 p refs Presented at the 1976 Natl. Computer Conf., New York, 7-10 Jun. 1976 Sponsored by ERDA
(UCRL-77624) Avail: NTIS HC $3.50

Analytic tools are used to automate the system security analysis function. With these tools, each step of the analysis methodology can be executed faster and more thoroughly than by manual methods alone. One useful analytic tool is the static informational tool that operates on a data base constructed from the system listings. The implementation of a static informational tool for system security analysis is presented and design considerations for future tools of this type are given. Author (ERA)

N77-21891# Massachusetts Inst. of Tech., Cambridge. Electronic Systems Lab.
DYNAMIC FILE ALLOCATION IN A COMPUTER NETWORK M.S. Thesis
Francisco deAsis Ros Peran Jun. 1976 182 p refs
(Contract N00014-75-C-1183; ARPA Order 3045)
(AD-A031808; ESL-R-667) Avail: NTIS HC A09/MF A01 CSCL 09/2

One of the main reasons computer networks are a major area of great attention and development today is their capability to provide the facilities for common use of data bases and information files by all computers in the system. When a file is used by several computers in the network, it can be stored in the memory of at least one of them and can be accessed by the other computers via the communication channels. In general, the cost or querying is reduced as we increase the number of copies in the system. On the other hand, storage costs, limitations on the size of the memories, and the cost of updating (every copy must be updated) will dictate decreasing of the number of copies. This thesis considers the problem of optimal dynamic file allocation when more than one copy is allowed to exist in the system at any given time. The use of two types of control variables, one for adding new copies to the system and the other for erasing copies, gives the model certain properties that permit the construction of an efficient algorithm to solve the optimization problem. In the last chapter, the model and algorithms are applied to several numerical examples. GRA

N77-28880# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences Management.
ALERTERS ON NETWORK DATABASES Final Report
Stanley F. Cohen Dec. 1976 59 p refs
(Contract N00014-75-C-0462)
(AD-A037438; Rept-77-02-07) Avail: NTIS HC A04/MF A01 CSCL 09/2

This thesis describes a system for alerting on network databases which consists of a simple sharable data management system with a facility for the user to create event-driven procedures called demons. A discussion is included of related work in database systems and artificial intelligence. Author (GRA)

N77-28881# Pennsylvania Univ., Philadelphia. Wharton School of Finance and Commerce.
ALERTING IN DATABASE SYSTEMS: CONCEPTS AND TECHNIQUES Final Report
Howard Lee Morgan and O. Peter Buneman Jun. 1976 22 p refs
(Contract N00014-75-C-0462)
(AD-A037437; Rept-75-12-04) Avail: NTIS HC A02/MF A01 CSCL 09/2

This paper discusses the subject of alerters, which can be used in a database management system to provide the same capability of informing a user when a specified state of the world (as reflected in the database) is reached. This paper describes recent research in adding alerting features to database management systems and provides a framework within which this research can be evaluated. GRA

N77-28882# Pennsylvania Univ., Philadelphia. Wharton School of Finance and Commerce.
AN ALERTING SYSTEM FOR A DATABASE MANAGEMENT SYSTEM M.S. Thesis. Final Report
Richard Cortes Dec. 1976 48 p
(Contract N00014-75-C-0462)
(AD-A037201; Rept-77-01-06) Avail: NTIS HC A03/MF A01 CSCL 09/2

This thesis describes an alerting system for a Database Management System which provides the end users with the facilities to monitor in a dynamic fashion the changes being made on the information, in order to perform some predetermined actions whenever certain conditions become true. The work includes the description of a simplified implementation of an alerting system made on the Wharton Alerting Network Database (WAND) which gives the foundation for a full implementation on a properly shared database system of the kind described by CODASYL DATABASE TASK GROUP in its April 71 report. Author (GRA)

N77-28870# California Univ., Livermore. Lawrence Livermore Lab.

CONTROLLING TRANSACTIONS BETWEEN DISTRIBUTED COMPUTER RESOURCES

J. E. Donnelley 4 Jun. 1977 9 p refs Presented at 5th Conf. on Computing Systems, Austin, Tex., 18 Oct. 1976
(Contract W-7405-eng-48)
(UCRL-78282-Rev-1) Avail: NTIS HC A02/MF A01

A prototype transaction controller system to provide analysts with direct access to distributed computer resources by making external resources internally available in a unified manner is described. The transaction controller differs from other systems with similar objectives in that its capability list operating system kernel supports an extendable set of uniformly processed internal objects and an enforced separation of internal responsibility which can be extended readily to distributed resources. The type independent resource sharing mechanism built upon these facilities allows most of the transaction controller software to concentrate on the difficult task of translating external resources which are physically different but semantically similar into identical internal resources. ERA

N77-32780# Illinois Univ., Urbana-Champaign. Center for Advanced Computation.

RESEARCH IN NETWORK DATA MANAGEMENT AND RESOURCE SHARING. EXPERIMENTAL SYSTEM REPORT Progress Report

David C. Healy, Edwin J. McCauley, and David A. Willcox 30 Sep. 1976 86 p refs 2 Vol.
(Contract DCA100-75-C-0021)
(AD-A042899; UIUC-CAC-DN-76-209; CAC-209; CLTC-WAD-6507) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report covers three topics: the implementation of an experimental distributed data management system, the design of a network virtual file system, and recent research in query strategies for distributed data management systems. GRA

N77-32781# Illinois Univ., Urbana-Champaign. Center for Advanced Computation.

RESEARCH IN NETWORK DATA MANAGEMENT AND RESOURCE SHARING. NETWORK FILE ALLOCATION

Geneva G. Belford 2 Aug. 1976 70 p refs 2 Vol.
(Contract DCA100-75-C-0021)
(AD-A042898; UIUC-CAC-DN-76-203; CAC-203; CCTC-WAD-6506) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report contains results to date of a study of file allocation in a network. Models and algorithms contained in the literature are surveyed. Some new models (for special situations and for update distribution through a primary site) are developed. Some new theorems for simplifying the computational problem are presented. Author (GRA)

N78-10774 Massachusetts Univ., Amherst.

A DATABASE MANAGEMENT FACILITY AND ARCHITECTURE FOR THE REALIZATION OF DATA INDEPENDENCE Ph.D. Thesis

David Wilber Stemple 1977 236 p
Avail: Univ. Microfilms Order No. 77-15127

The data base facility consists of a high level data control language, a pseudo-machine language, a compiler from the high level to the pseudo-machine language, and an interpreter for the pseudo-machine language. A major feature of the architecture is the generation, from non-procedural schemas, of data base managers written in the high level data control language and tailored to the individual schemes. A second significant feature of the architecture is the use of multiple levels of optional binding. The architecture reflects the decomposition of data independence into vertical and horizontal data independence. Vertical data independence is the freedom to change lower level realizations of data structures and manipulations without changing the responses of higher level queries. Dissert. Abstr.

N78-14020# California Univ., Berkeley. Lawrence Berkeley Lab.

PROCEEDINGS OF THE SECOND BERKELEY WORKSHOP ON DISTRIBUTED DATA MANAGEMENT AND COMPUTER NETWORKS

1977 267 p refs Presented at 2d Workshop on Distributed Data Management and Computer Networks, Berkeley, Calif., 25 May 1977
(Contract W-7405-eng-48)
(LBL-6416; Conf-770521) Avail: NTIS HC A12/MF A01

Topics covered include: overview of computer network and distributed database problems; design of distributed database systems; protocols; currency control; data semantics; and optimization models for networks. Two papers from the conference have already been indexed, and may be found under the heading CONF-770521 in the report number index. Author (ERA)

N78-10668# Massachusetts Inst. of Tech., Cambridge.

DEADLOCK DETECTION IN COMPUTER NETWORKS M.S. Thesis

Barry Goldman Sep. 1977 88 p refs
(Contract N00014-75-C-0661)
(AD-A047025; MIT/LCS/TR-185) Avail: NTIS HC A05/MF A01 CSCL 09/2

The problem of detecting process deadlocks is common to transaction oriented computer systems which allow data sharing. Several good algorithms exist for detecting process deadlocks in a single location facility. However, the deadlock detection problem becomes more complex in a geographically distributed computer network due to the fact that all the information needed to detect a deadlock is not necessarily available in a single node, and communications may lead to synchronization problems in getting an accurate view of the network state. In this thesis, two published algorithms dealing with deadlock detection in computer networks are discussed, and examples demonstrating the failure of these algorithms are given. Two algorithms are then presented for detecting deadlocks in a computer network which allows processes to wait for access to a portion of a database, or a message from another process. The first algorithm presented is based on the premise that there is one control node in the network, and this node has primary responsibility for detecting process deadlocks. The second, and recommended, algorithm distributes the responsibility for detecting deadlocks among the nodes in which the involved processes and resources reside. Thus a failure of any single node has limited effect upon the other node in the network. A computer model of the decentralized (second) algorithm was designed and it is described in the thesis. Author (GRA)

N78-24839# Kansas State Univ., Manhattan. Dept. of Computer Science.

PROJECT REPORT FOR FUNCTIONALLY DISTRIBUTED COMPUTER SYSTEMS DEVELOPMENT: SOFTWARE AND SYSTEMS STRUCTURE, PART 1 Interim Report, 15 Jan. 1976 - 1 Nov. 1977

Virgil E. Wallentine Oct. 1977 75 p refs
(Grant DAAG29-76-G-0108)
(AD-A052751; ARO-13835.1-A-EL-Pt-1) Avail: NTIS HC A04/MF A01 CSCL 17/2

This is the first of a two part report of the research performed by Kansas State University in multiple processor computer systems and networks. This report covers the research effort through the design phase. The known problems are defined and alternative solutions are developed. An alternative solution is selected for the building of a prototype network. Author (GRA)

N78-24840# Kansas State Univ., Manhattan. Dept. of Computer Science.

PROJECT REPORT FOR FUNCTIONALLY DISTRIBUTED COMPUTER SYSTEMS DEVELOPMENT: SOFTWARE AND SYSTEMS STRUCTURE, PART 2 Final Report, 1 Nov. 1976 - 15 Jan. 1977

Virgil E. Wallentine 7 Feb. 1978 100 p refs
(Grant DAAG29-76-G-0108)

(AD-A052752; ARO-13805.1-A-EL-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 17/2

This is the second and final part of the report of research performed by Kansas State University in multiple processor computer systems and networks. Part 1 covered the Design Phase of the effort; and this report covers the follow-on implementation, integration, test, and demonstration of a prototype model of the network. The network model consists of a cluster of minicomputers and microcomputers with supporting software. The model has been named MIMICS (Mini-MicroComputer System) and uses a high-speed vendor-independent data bus, named KSUBUS, that was designed, developed, and built for this network. Network hardware included Interdata's 85, 7/32, 8/32 and IBM 370/158. The principal network software is a message system which is capable of residing in a variety of computers. The hardware independence is achieved by design and by coding the software in Concurrent PASCAL. A specification of a distributed data base management system was developed and implemented in the MIMICS network. A DBMS named TOTAL was used in the prototype. The general problems of DDBMS were studied, and solution syntheses are presented as well as a simulation model for a back-end DBMS.
Author (GRA)

N78-25806# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A STUDY OF CRITICAL FACTORS IN THE DEVELOPMENT OF AIR FORCE COMPUTERIZED MANAGEMENT INFORMATION SYSTEMS M.S. Thesis
Jere Wayne Retzer Dec. 1977 125 p refs
(AD-A052914; AFIT/GS/SM/77D-28) Avail: NTIS HC A06/MF A01 CSCL 05/1

A number of the factors important to MIS were found to vary with system size, difficulty and contractor involvement. Factor analyses of the sample and two subsets each revealed three factors: user involvement; capabilities of the project organization; and planning and control. Several predictive models were developed for system success, the best of which explained 43% of the variance in success for the total sample, and 52% of the variance in more strongly contracted efforts. It was concluded that six factors are critical to MIS, the three factor analysis factors plus: size and difficulty; criteria for continuing the project; and test time. A process model, consistent with the data, of the initial stages of a MIS was proposed. Author (GRA)

N78-27818 Duke Univ., Durham, N. C.
EQN MODELS FOR THE ANALYSIS AND DESIGN OF A COMPUTER NETWORK OF FUNCTIONALIZED PROCESSORS Ph.D. Thesis
Robert Leland Leech 1977 199 p
Avail: Univ. Microfilms Order No. 78-07612

The network queuing theory is used to establish three Exponential Queueing Network (EQN) models of computer network systems. A projected computer network is based on the specification of processing functions for model representation. Example functions used in this work are computation, data base management, communications and terminal/access interface as would be applicable to a military command and control computer system. The models may be used for trade-off analysis of critical performance criteria. Additionally, a basic method for the synthesis/determination (design) of processor computer power to ensure a load balanced network is ascertained. The three models and their respective computer network evaluations for trade-off analysis are pursued with their inherent advantages and disadvantages. Additionally, these models are compared with a classical event driven simulation in order to demonstrate their internal consistency and to provide a basis for verification.
Dissert. Abstr.

N78-30829# Joint Publications Research Service, Arlington, Va.
WORK ON CREATION OF COMPUTER NETWORKS TOLD

E. Yakubaytis *In its* Transl. on USSR Sci. and Technol.: Phys. Sci. and Technol., No. 46 (JPRS-71727) 22 Aug. 1978 p 7-10 Transl. into ENGLISH from Sov. Latv. (Riga), 15 Jun. 1978 p 2
Avail: NTIS HC A05/MF A01

The economic and political significance of local computer networks is the Soviet Union is discussed. Experimental communications sessions with computers installed in Moscow, the United States, Belgium, Austria, Italy and France are being conducted. Trial sessions through communications satellites are going on. The institutes of the Academy of Sciences of the Latvian SSR are conducting work related to the creation of an academy-wide experimental computer network (EVS). The first line, already in experimental operation, includes twelve interconnected computers installed at these institutes: the physicoenergetics, mechanics of polymers, organic synthesis, the chemistry of wood and electronics and computer technology. In this network, having mini-equipment, it is possible to work with all the other machines and especially with the large electronic ones installed at the laboratory. The network processes architectural decisions, checks machine interaction methods, and creates the apparatus for rapid communications. A.R.H.

N79-14823# Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
STATIC FORCE TESTS ON THE AEDC-VKF STANDARD 5 DEG. CONES IN TUNER, BOUNDARY LAYER FLOW, REYNOLDS NUMBER, FLOW FIELDS, DATA BASES, AERODYNAMIC CONFIGURATION, SURFACES
Aug. 1978 42 p
(AD-A059848) Avail: NTIS HC A03/MF A01 CSCL 20/4

Static stability and base pressure tests were conducted, on the AEDC-VKF standard force cone. The tests were performed at nominal Mach numbers of 3.01, 3.25, 3.51, 3.76, 4.02, 4.52, 5.04, 5.58, and 5.95 at free-stream unit Reynolds numbers ranging from 800,000 per foot to 7,000,000 per foot. The angle-of-attack and sideslip angle ranges were -13 to 13 deg. The effects of nose geometry, boundary layer trips, fins, Reynolds number, and model location in the test section were investigated. Model flow-field photographs were obtained on all configurations at selected conditions. Author (GRA)

N80-11823# Fiat Research Center, Turin, Italy. Centro Informazione Tecnica.
THE DATA BANKS. WHAT THEY ARE AND HOW THEY ARE USED [LE BANCHE DATI. COSA SONO E COME SI UTILIZZANO]
Bruno Zambon Mar. 1979 243 p refs In ITALIAN
Avail: NTIS HC A11/MF A01

A detailed panoramic description of data banks and their utilization is presented. Information retrieval, data banks and host computers, communication with host computers (LIS, SDC, and IRS), conversational systems (Dialog, Orbit, Recon), installation and management of online information retrieval systems, systems limitations, practical examples of bibliographic research, and nonbibliographic databases online, are discussed. Author (ESA)

N80-13828 Pennsylvania Univ., Philadelphia.
DISTRIBUTED DATABASE ORGANIZATION FOR OPTIMAL COMPUTER NETWORK RESPONSE TIME Ph.D. Thesis
Robert Michael Farrell 1979 180 p
Avail: Univ. Microfilms Order No. 7928126

The problem of optimizing response time of accesses to shared programs and data in a computer network is investigated. The key characteristics of a data sharing network are defined and its attributes are modelled. These are contrasted with the characteristics of communications (packet switching) or resource sharing networks. Two network optimization models are developed: a deterministic model and a stochastic model. Search algorithms are presented which determine optimal solutions to each model and assessments of the complexity of each algorithm are developed. Since the deterministic algorithms are exponential in complexity, heuristic algorithms of polynomial complexity are developed, to allow application of the models to very large computer networks. Applications of the models to distributed data bases, as well as to centralized data management systems in computer networks are discussed. Guidelines for selection of the proper model for an application, based on expected access traffic, are also presented. Dissert. Abstr.

N80-14794# Forschungsinstitut fuer Funk und Mathematik, Werthoven (West Germany).
A COST OPTIMAL SOLUTION FOR DEADLOCKED PROCESSES
Wolfgang Schulze Sep. 1978 28 p refs In GERMAN; ENGLISH summary
(Rept-273) Avail: NTIS HC A03/MF A01

The cheapest process combination for removing deadlocks from a system of deadlocked processes with given backup cost is discussed. A method is presented which finds a minimum cut in a graph with node values after detecting the deadlock and after the elimination of redundant processes by evaluation of maximum flow. Estimates of the run times for single subtasks show that the method is applicable in practice. Author (ESA)

N80-18784 Ohio State Univ., Columbus.
INTERPROCESS COMMUNICATION AND SYNCHRONIZATION FOR DISTURBED SYSTEMS Ph.D. Thesis
Roberto Pardo 1979 242 p
Avail: Univ. Microfilms Order No. 8001800

Strategies for routing multi destination messages, mainly in local architectures are developed. The exchange of multi destination messages deals with the design of several protocols at various levels that ensure different degrees of reliability. The levels considered are: (1) unreliable level, where the protocol implements process addressing and chooses the best multi destination routing algorithm; (2) best effort to deliver level, where the protocol attempts to deliver the message to as many of its destinations as possible, filtering duplicates and out of order messages at each destination; and (3) guarantee to deliver level, where the protocol ensures that every destination will receive the message, regardless of momentary unavailability due to communication or processing system failures. Dissert. Abstr.

N80-18786 Illinois Univ. at Urbana-Champaign.
A COMPREHENSIVE APPROACH TO THE PERFORMANCE MEASUREMENT AND EVALUATION OF LARGE-SCALE COMPUTER SYSTEMS Ph.D. Thesis
Herbert Walker Merrill, Jr. 1979 66 p
Avail: Univ. Microfilms Order No. 8004228

The performance measurement and evaluation of large scale computer systems do not require hardware and software monitors as data collectors, but rather a comprehensive approach is described which uses only the computer system's accounting file as the data source. This data is processed into a performance data base which is the primary tool of this approach, and it is used to establish meaningful and measurable performance objectives. The objectives for service are related to resource consumption by a charging scheme that charges a higher price for better service, and thus capacity measures (for equipment acquisition or release) relate directly to qualitative and quantitative measures of user satisfaction versus supplier's costs. The implementation of the performance data base is described and the development of specific objectives for several systems (batch, interactive) is described. Examples of the capacity measures are shown, and several examples of the simplicity, cost-effectiveness and utility of the approach are described. Dissert. Abstr.

N80-29066# National Technical Information Service, Springfield, Va.
AEROSPACE COMPUTER SYSTEMS: SPACE AND GUIDED MISSILES APPLICATIONS. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1978 - Mar. 1980
Brian Carrigan May 1980 180 p Supersedes NTIS/PS-79/0315; NTIS/PS-78/0290
(PB80-810187; NTIS/PS-79/0315; NTIS/PS-78/0290) Avail: NTIS HC $30.00/MF $30.00 CSCL 09B

A bibliography containing 152 abstracts addressing computer hardware and supporting software for spacecraft and guided missile applications is presented. Onboard data processing equipment, telemetering data processing, and navigation and guidance computers are considered. GRA

N80-32145*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
OVERVIEW OF INTEGRATED PROGRAMS FOR AEROSPACE-VEHICLE DESIGN (IPAD)
Robert E. Fulton Washington Sep. 1980 23 p refs Presented at IPAD Natl. Symp., Denver, 17-19 Sep. 1980
(NASA-TM-81874; L-14022) Avail: NTIS HC A02/MF A01 CSCL 09B

An overview of a joint industry/government project, denoted Integrated Programs for Aerospace-Vehicle Design (IPAD), which focuses on development of technology and associated software for integrated company-wide management of engineering information is presented. Results to date are summarized and include an in-depth documentation of a representative design process for a large engineering project, the definition and design of computer-aided design software needed to support that process, and the release of prototype software to integrated selected design functions. M.G.

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

A75-17348 # **Computer representation of complex-system structures (Reprezentacja komputerowa struktury zlozonych systemow).** R. Jakubowski and J. Krol. *Podstawy Sterowania*, vol. 4, no. 4, 1974, p. 371-379. In Polish.

A formalism for generating a complex system by combining its subsystems is proposed, along with a data structure for storing the representation of the system in a computer. Each system element and its connection to other elements is characterized by a quadruple; the set of all quadruples of the system is termed the data base. The effectiveness of using a list-type data base composed of simple lists that correspond to the data bases of the subsystems is demonstrated. V.P.

A75-29437 # **A method for representing and organizing information retrieval and processing in a data bank (Ob odnom sposobe predstavleniia, organizatsii poiska i obrabotki informatsii v ISS).** A. V. Sollogub and A. A. Platova. *Upravliaiushchie Sistemy i Mashiny*, Jan.-Feb. 1975, p. 10-14. In Russian.

A formal description is given of the information retrieval and processing in a data bank designed to aid the administration of a large enterprise. The system described can be realized using two Minsk-22 computers operating in the interrogation-response mode. An input language is devised which provides for direct access to the data bank via remote teletype. A.T.S.

A76-18176 # **On managing interference caused by database sharing.** M. Trinchieri (Honeywell Information Systems, Inc., Waltham, Mass.). *Alta Frequenza* (English Edition), vol. 44, Nov. 1975, p. 641-650. 7 refs.

When in a multiprocessing environment various processes share a data base to read and modify it, there is some probability that they interfere with each other. In the present mechanisms of protection against interference, the data base is generally partitioned among the users by assignments or simpler methods. A general law on the interference phenomenon is derived which provides the basis for a new class of mechanisms of protection and a criterion for evaluting the conventional mechanisms. The law shows that two approaches are possible: mechanisms that allow free access, but keep monitoring the actual sequence of operations and intervene when interference would otherwise occur; and mechanisms that place properly chosen constraints on the freedom of operations so as to exclude unwanted patterns. The conventional mechanisms reflect the second approach. The new mechanisms use the first approach, or both, and permit a higher degree of activity. V.P.

A76-29380 # **General aspects of teaching pattern recognition (Obshchie aspekty obucheniia raspoznavaniiu obrazov).** A. M. Prianitskii and N. A. Vasilenko. *Otbor i Peredacha Informatsii*, no. 44, 1975, p. 14-25. In Russian.

Fundamental aspects of teaching pattern recognition in systems for information analysis, including selection of the elementary criteria, approximation of the teaching sample, and evaluation of the effectiveness of the decisive rule with the aid of the set of criteria, are examined. The problem of the economy of the memory of the discriminating system is examined from a theoretical and technological point of view. An algorithm for branched criteria selection is presented. C.K.D.

A77-16968 **Artificial intelligence - Cooperative computation and man-machine symbiosis.** M. A. Arbib. *IEEE Transactions on Computers*, vol. C-25, Dec. 1976, p. 1346-1352. 29 refs. Grant No. NIH-5-R01-NS-09755-07-COM.

The paper examines the current status and future prospects of artificial intelligence (AI) and reviews briefly some directions of research. Current work in AI is summarized by saying that it revolves around the representation of knowledge, with the augmented interfacing of natural language understanding and computer vision and speech recognition. The changing views of researchers regarding learning and the representation of knowledge are traced, and the dominant trend of focusing on 'microworlds' - restricted knowledge domains - is noted, whereby one tries to tailor representations of knowledge to the spectrum of questions about that restricted domain. Some of the signal successes of robotics and its promises are pointed out, and the problems associated with the new vista of natural language understanding are briefly mentioned. P.T.H.

A79-48005 **Decision directed multitarget tracking.** C. L. Morefield (TERAC, Inc., San Diego, Calif.). In: 1978 Conference on Decision and Control, 17th, San Diego, Calif., January 10-12, 1979, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 1195-1201. Contract No. N00014-77-C-0296.

The paper discusses an application of Bayesian decision theory to the problem of multisensor, multitarget tracking. Algorithms for carrying out the tasks associated with intersensor correlation are considered. One particular algorithm (the 'k-track clustering' algorithm) is evaluated in order to highlight the fundamental combinatorial structure of large-area surveillance. Multitarget-tracking data processing at the sensor level produces track files consisting of object state vectors and estimation error covariance at specific points in time. It is noted that there is a critical need for parameter tuning against truth models before the algorithm can be trusted in an operational situation. V.T.

A80-17537 **Applications of probabilistic information theory to relational databases.** M. G. Thomason (Tennessee, University, Knoxville, Tenn.). In: Digital processing of aerial images; Proceedings of the Seminar, Huntsville, Ala., May 22-24, 1979. Bellingham, Wash., Society of Photo-Optical Instrumentation Engineers, 1979, p. 224-229. 14 refs.

The impact of data structures on digital image processors is briefly discussed. The paper focuses on describing some initial applications of the classical probabilistic information theory of Shannon to study aspects of the processes of information transfer in the use of large, static, relational databases with time-invariant statistics - the kind of data-base that often is the digitized version of an image to be 'understood' in some way. In conclusion, data structure design should be considered an inherent part of the development of digital image processing techniques. Probabilistic information theory provides methods for data-base compression and for the study of information transfer in image database usage. S.D.

A80-43603 **Coherent optical pattern recognition system for optical word recognition on a microfilm data base.** J. E. Hinds (U.S. Central Intelligence Agency, Washington, D.C.), D. Casasent, and F. Caimi (Carnegie-Mellon University, Pittsburgh, Pa.). In: Optical pattern recognition; Proceedings of the Seminar, San Diego, Calif., August 29, 30, 1979. Bellingham, Wash., Society of Photo-Optical Instrumentation Engineers, 1979, p. 9-16. 15 refs. Research supported by the U.S. Central Intelligence Agency.

The results are provided of the second phase of a program to determine the feasibility of fabrication of a coherent optical pattern recognition system to locate all pages in a microfilm data base on which a given key word occurs. Results obtained using an optical frequency plane correlator system with weighted matched spatial filter synthesis in a scaling correlator topology have been most promising. By proper matched spatial filter synthesis and system design, correlation degradations due to various expected differences between the input and reference functions in this optical word recognition system have been decreased to acceptable levels. (Author)

N76-32909# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
A SYSTEM FOR REPRESENTING AND USING REAL WORLD KNOWLEDGE M.S. Thesis
Scott E. Fahlman May 1975 86 p refs
(Contract N00014-75-C-0643)
(AD-A021178; AIM-331) Avail: NTIS CSCL 06/4

This paper describes progress to date in the development of a system for representing various forms of real-world knowledge. The knowledge is stored in the form of a net of simple parallel processing elements, which allow certain types of deduction and set-intersection to be performed very quickly and easily. It is claimed that this approach offers definite advantages for recognition and many other data-accessing tasks. Suggestions are included for the application of this system as a tool in vision, natural-language, etc. Author (GRA)

N77-15720# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
PROPOSAL TO THE ADVANCED RESEARCH PROJECTS AGENCY
Patrick H. Winston May 1976 122 p
(Contract N00014-75-C-0643)
(AD-A028709; AI-M-366) Avail: NTIS HC A06/MF A01 CSCL 09/2

This is the substance of a proposal submitted in June, 1975, for research in the areas of large data bases and intelligent terminals, applications of machine vision and manipulation, basic studies in Artificial Intelligence, and LISP machine development. Author (GRA)

N77-19804# Pattern Analysis and Recognition Corp., Rome, N.Y.
APPLICATION OF PATTERN ANALYSIS AND RECOGNITION TO I AND W Final Technical Report, Mar. 1975 - Jan. 1976
Christopher Landauer, John Morris, Clinton Mah, John Sanders, Frank Blackburn, and David Bennett Griffiss AFB, N.Y. RADC Jul. 1976 69 p
(Contract F30602-75-C-0157; AF Proj. 4594)
(AD-A029395; PAR-76-3; RADC-TR-76-226) Avail: NTIS HC A04/MF A01 CSCL 09/2

The goal of the initial three-month feasibility study reported here has been the design and testing of critical components of the Message Extraction Through Estimated Relevance (METER) System. Description of the designs and tests are included in this report. In addition, background materials concerning the goals of the project are presented, together with a description of associative methods for document analysis and classification. Finally, a theoretical discussion introduces questions for which additional research will be required. Reference is made to the RADC Automatic Document Classification On-Line (RADCOL) system, which furnished initial designs for METER components. An evaluation of the RADCOL system is provided in RADC-TR-75-208. Author (GRA)

N77-21900# Rice Univ., Houston, Tex. Dept. of Electrical Engineering.
FEATURE EXTRACTION AND CLASSIFICATION RESULTS FOR THE BATCHELOR-HAND-BRUMFITT ARTIFICIAL DATA BASE
S. A. Starks, K. C. Pau, and R. J. P. DeFigueiredo Oct. 1976 21 p refs
(Grant AF-AFOSR-2777-75; AF Proj. 2304)
(AD-A032897; EE-TR-7610; AFOSR-76-1230TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

A study is presented on the performance of feature extractors and classifiers on the 10-dimensional artificial data base provided by B. G. Batchelor, D. J. Hand, and P. G. Brumfitt of the Department of Electronics, University of Southampton, Southampton. On feature extraction, specifically three techniques for the extraction of the best one dimensional subspace were examined on the above data: the single linear feature (SLF) extraction algorithm developed at Rice; the single feature (SFB) corresponding to the maximum Bhattacharyya distance between pattern classes; and the optimal Karhunen-Loeve (KLF) subspace. Classification performance on the test set was 73.2% for SLF, 66.2% for SFB. Classification in subspace of dimension greater than one was also investigated. In the entire 10-dimensional space, a classification performance of 80.8% was attained using maximum likelihood classifier. GRA

N77-23811# Naval Research Lab., Washington, D.C. Computer Science Lab.
APPLICATION OF AUTOMATIC CLUSTERING TO EMITTER IDENTIFICATION Interim Report
James Slagle and Richard C. T. Lee Nov. 1976 14 p refs
(NRL Proj. B02-23)
(AD-A033916; NRL-MR-3407) Avail: NTIS HC A02/MF A01 CSCL 12/1

The goal of clustering is the partitioning of a given set of objects into subsets called clusters in such a way that the objects in a cluster are similar to one another and that objects in different clusters are dissimilar. Clustering may help in getting a more or less direct understanding of the relationships among the objects, and it may be useful as a first step in pattern recognition. Some possible applications are automatic phoneme recognition, data base management systems, personnel classification, detection of errors in files and computer security. Several clustering methods were applied to data sets of practical importance. Automatic pattern recognition using the k nearest neighbors was applied. An efficient method for selecting a good subset from the full of 44 features was tried. In all cases, the results were good. Author (GRA)

N77-26878# Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
REPORT OF THE 1976 JOINT WORKSHOP ON PATTERN RECOGNITION AND ARTIFICIAL INTELLIGENCE Interim Report
C. H. Chen 21 Dec. 1976 20 p refs Workshop held at Hyannis, Mass., 1-3 Jun. 1976
(Grant AF-AFOSR-2951-76)
(AD-A037503; EE-76-7; AFOSR-TR-77-0124) Avail: NTIS HC A02/MF A01 CSCL 06/4

This is the final report of the technical program of the workshop held June 1-3, 1976, at Hyannis, Mass. Papers presented at the meeting are carefully reviewed by topics: scene analysis and image processing, syntactic and statistical pattern recognition, relational data structure and data base management, language understanding and speech recognition, biomedicine, production systems and knowledge-based systems, computer graphics, game-playing programs and distortion modeling. Panel discussions sessions are examined. Recommendation and assessment for future developments in both pattern recognition and artificial intelligence are also presented. Author (GRA)

N77-27801# University of Southern Calif., Los Angeles. Image Processing Inst.
THE USC-IMAGE PROCESSING INSTITUTE DATA BASE
Ray Schmidt Oct. 1976 34 p
(Contract F33615-76-C-1203; ARPA Order 3119)
(AD-A037725; USCIPI-710) Avail: NTIS HC A03/MF A01 CSCL 09/4

This report represents effort expended in attempting to meet the needs of the ARPA-IPTO Image Understanding community in providing the availability of a digital image data base. The data base will never be complete as it is the intention of the USC-Image Processing Institute to update and maintain the base as long as the sponsor and scientific community indicates a need for same. The picture files are individually or collectively accessible either over the ARPANET or via the U.S. mails. Author (GRA)

N77-28868*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE NAVIGATION SYSTEM OF THE JPL ROBOT
Alan M. Thompson 15 Jul. 1977 42 p refs
(Contract NAS7-100)
(NASA-CR-154123; JPL-Publ-77-20) Avail: NTIS HC A03/MF A01 CSCL 09B

The control structure of the JPL research robot and the operations of the navigation subsystem are discussed. The robot functions as a network of interacting concurrent processes distributed among several computers and coordinated by a central executive. The results of scene analysis are used to create a segmented terrain model in which surface regions are classified by traversibility. The model is used by a path planning algorithm, PATH, which uses tree search methods to find the optimal path to a goal. In PATH, the search space is defined dynamically as a consequence of node testing. Maze-solving and the use of an associative data base for context dependent node generation are also discussed. Execution of a planned path is accomplished by a feedback guidance process with automatic error recovery. Author

N78-26812# Massachusetts Inst. of Tech., Cambridge. Artifical Intelligence Lab.
THE FRL PRIMER
R. Bruce Roberts and Ira P. Goldstein Jul. 1977 23 p refs
(Contract N00014-75-C-0643)
(AD-A053306; AI-M-408) Avail: NTIS HC A02/MF A01 CSCL 06/4

The Frame Representation Language (FRL) is an experimental language written to explore the use of frames as a knowledge representation technique. The term 'frame' as used in FRL was inspired by Minsky's (75) development of frame theory. FLR extends the traditional Property List representation scheme by allowing properties to have comments, defaults and constraints, to inherit information from abstract forms of the same type, and to have attached procedures triggered by adding or deleting values, or if a value is needed. We introduce FRL with the aid of a simple example: WHOSIS, a database of AI person's names, addresses, interests, and publications. A second section contains an abridged manual describing FRL's most-used commands and conventions. Author (GRA)

N78-28788# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
COMPUTER IMAGE SEGMENTATION: STRUCTURED MERGE STRATEGIES
R. A. Jarvis Dec. 1977 38 p refs
(Grant NSF ENG-76-18567)
(PB-277930/4; TR-EE77-44) Avail: NTIS HC A03/MF A01 CSCL 09B

Image segmentation is concerned with the spatial definition of visually coherent entities constituting a scene. An evaluation is done of a merge procedure for image segmentation built upon an image fragment data base that can be easily maintained during a sequence of merges. Some preliminary examples are presented and a number of comments on future work are made. GRA

N80-22013# Naval Ocean Systems Center, San Diego, Calif.
HIGHER ORDER LOGIC FOR PLATFORM IDENTIFICATION

IN A PRODUCTION SYSTEM. A METHOD OF EXTENDING THE CAPABILITIES OF A PRODUCTION SYSTEM APPLIED TO TACTICAL SITUATION ASSESSMENT
R. A. Dillard 17 Oct. 1979 49 p refs
(XR0140801)
(AD-A080555; NOSC/TD-288) Avail: NTIS
HC A03/MF A01 CSCL 09/4

This report describes a method of extending the capabilities of a production system applied to tactical situation assessment, to enable the system, whatever its type, to perform the higher order logical reasoning required for the solution of many platform identification problems. The method is implemented through (1) production rules for constructing and updating an intermediate framework in the system's data base, a framework that supports the process of associating tracks with platforms; and (2) production rules for performing the association process by using, for example, the notion of complete subsets of platform files and track files, along with logical sequences of reasoning. Many of the system logic rules underlying this method have been implemented in an experimental production system and tested against hypothesized data. Two examples are given, along with a step-by-step description of the response of the system to each new piece of information. The method as it is described uses only data having high confidence values. However, the conclusions which would logically follow from different assumptions about particular tracks or platforms could be determined by recording logical conclusions derived from less certain data, then reinitializing the data base by removing previous conclusions and replacing selected questionable assertions with alternative assertions. GRA

N80-24037# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science
ON OPTIMISTIC METHODS FOR CONCURRENCY CONTROL Interim Report
H. T. Kung and John T. Robinson Oct. 1979 21 p refs
(Contract N00014-76-C-0370; Grant NSF MCS-78-23676)
(AD-A081452; CMU-CS-79-149) Avail: NTIS
HC A02/MF A01 CSCL 09/2

Most current approaches to concurrency control in database systems rely on locking of a data objects as a control mechanism. In this paper, two families of non-locking concurrency controls are presented. The methods used are ('optimistic' in the sense that rely mainly on transaction backup as a control mechanism, 'hoping' that conflicts between transactions will not occur. Applications where these methods should be more efficient than locking are discussed. GRA

N80-28087 Purdue Univ., Lafayette, Ind.
THE OPTIMIZATION OF QUERY PROCESSING ON DISTRIBUTED DATABASE SYSTEMS Ph.D. Thesis
Alan Raymond Hevner 1979 278 p
Avail: Univ. Microfilms Order No. 8015484

A detailed cost model of distributed query processing is developed and two optimization objectives, response time and total time are defined. The problem of finding a minimal cost processing strategy for any given distributed query is proved to be NP-hard. For a special class of queries, optimization algorithms are presented that derive minimal response time and minimal total time processing strategies. The techniques found in these optimal algorithms are used as a basis to develop effective heuristics that find efficient processing strategies for general queries. The heuristic algorithms, Algorithm GENERAL and Algorithm FAST, compare favorably with other proposed optimization algorithms in terms of complexity and quality of derived processing strategies. To evaluate the performance of distributed query optimization methods in a multiprocessing environment, a hybrid simulation model of a distributed base system is designed. The results of two query studies using the model show the importance of optimizing distributed queries. The relative performance of several proposed optimization algorithms is seen to be similar. Dissert. Abstr.

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N78-19888*# Douglas Aircraft Co., Inc., Santa Monica, Calif.
A SOLUTION TO THE SURFACE INTERSECTION PROBLEM Final Report
H. G. Timer 29 Nov. 1977 50 p
(Contract NAS2-9590)
(NASA-CR-152116; MDC-J7789) Avail: NTIS
HC A03/MF A01 CSCL 12A

An application-independent geometric model within a data base framework should support the use of Boolean operators which allow the user to construct a complex model by appropriately combining a series of simple models. The use of these operators leads to the concept of implicitly and explicitly defined surfaces. With an explicitly defined model, the surface area may be computed by simply summing the surface areas of the bounding surfaces. For an implicitly defined model, the surface area computation must deal with active and inactive regions. Because the surface intersection problem involves four unknowns and its solution is a space curve, the parametric coordinates of each surface must be determined as a function of the arc length. Various subproblems involved in the general intersection problem are discussed, and the mathematical basis for their solution is presented along with a program written in FORTRAN IV for implementation on the IBM 370 TSO system. Author

N79-32039# Argonne National Lab., Ill.
FORMULATION AND APPLICATION OF A SOURCE FINDING ALGORITHM
R. J. Yamartino and D. J. Lamich 1979 7 p refs Presented at 4th Symp. of Turbulence, Diffusion, and Air Pollution, Boston, 15-18 Jan. 1979
(Contract W-31-109-eng-38)
(CONF-790142-2) Avail: NTIS HC A02/MF A01

A formalism was developed for utilizing data obtained from an air quality monitoring network to determine the locations and strengths of those sources contributing most significantly to the observed concentrations. The algorithm for determining source location and strength is given and discussed. Application of this algorithm to a large data base has indicated its ability to identify actual source locations and strengths. Approximate solutions, while more economical, seem only capable of locating the largest of the sources and thus, seem inadequate except in unusually simple situations where each receptor concentration measurment is clearly dominated by the presence of a single source. DOE

N80-17774# Stanford Univ., Calif. Dept. of Computer Science.
PERFORMANCE OF UPDATE ALGORITHMS FOR REPLICATED DATA IN A DISTRIBUTED DATABASE Ph.D. Thesis
Hector Garcia-Molina Jun. 1979 164 p refs
(Contract MDA903-77-C-0322)
(AD-A075268; SU-STAN-CS-79-744; SU-STAN-CSL-TR-172)
Avail: NTIS HC A08/MF A01 CSCL 12/1

In this thesis we study the performance of update algorithms for replicated data in a distributed database. In doing so, we also investigate several other related issues. We start by presenting a simple model of a distributed database which is suitable for studying updates and concurrency control. We also develop a performance model and a set of parameters which represent the most important performance features of a distributed database. The distributed database models are used to study the performance of update algorithms for replicated data. This is done in two steps. First the algorithms are analyzed in the case of completely replicated databases in a no failure, update only environment. Then, the restrictions that we made are eliminated one at a time, and the impact on the system performance of doing this is evaluated. For the first step, we develop a new technique for analyzing the performance of update algorithms. This iterative technique is based on queueing theory. Several well known update algorithms are analyzed using this technique. The performance results are verified through detailed simulations of the algorithms. The results show that centralized control algorithms nearly always perform better than the more popular distributed control algorithm. GRA

N80-18829# Wisconsin Univ. - Madison. Mathematics Research Center.
CALCULATING CONSTRAINTS ON RELATIONAL EXPRESSIONS
A. Klug May 1979 84 p refs
(Contract DAAG29-75-C-0024)
(AD-A077092; MRC-TSR-1961) Avail: NTIS
HC A05/MF A01 CSCL 12/1

A desirable feature of a database management system is the ability to support many views of the database via several user models. In order to provide this support while allowing the user to believe that his/her view and data model are the only ones, the database system must have a number of facilities. One of the most important of these is a mechanism to tell when view constraints will be satisfied given that the underlying database constraints are satisfied so that the user always sees what is expected. This paper deals with a particular instance of this problem where the constraints are functional dependencies and the views are created through relational algebra expressions. The problem immediately reduces to the problem of calculating all valid functional dependencies (and other constraints) on a relational algebra expression over relations in the base schema. The problem is undecidable in general but we give a sound and complete algorithm when set difference is omitted from relational algebra. GRA

N80-21084# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
APPLICATION OF BAYESIAN APPROACH TO UPDATING AIR FRAME CERs M.S. Thesis
Walter D. Dietrich Sep. 1979 179 p refs
(AD-A077064; AFIT/GSM/SM/78D-30) Avail: NTIS
HC A09/MF A01 CSCL 15/5

This study investigates a Bayesian approach for developing a parametric equation which will estimate the recurring cost of the next lot/unit of an airframe program. Recurring costs are predicted because definitionally these costs are expected to reflect the cost for a follow-on production unit. Although the data base used for this study consisted of production cost information, the Bayesian approach may be useful for providing a parametric estimate of production cost using recurring costs from a prototype effort. However, until definitional problems associated with seperating engineering and tooling costs into recurring and nonrecurring categories are resolved, predictions of production or next unit engineering and tooling costs will be marginal. Because of the definitional problem, total cost, (nonrecurring and recurring) was used in this study to develop Bayesian updated CERs for the engineering and tooling categories. GRA

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

A76-10793 # **Study of large numerical arrays with missing data (Izuchenie bol'shikh chislovykh massivov s propushchennymi dannymi).** B. M. Litvakov. *Avtomatika i Telemekhanika*, Aug. 1975, p. 81-92. In Russian.

The available formal methods for studying large data arrays are oriented towards processing completely filled rectangular tables. The paper poses the problem of developing formal methods for studying tables with many entries missing. With two problems of determining the structure of an array as examples, it is shown that a numerical array with random distribution of missing entries is just as suitable as a rectangular matrix with the same number of known elements. (Author)

A76-22536 **Study of large numerical data files with missing data.** B. M. Litvakov. (*Avtomatika i Telemekhanika*, Aug. 1975, p. 81-92.) *Automation and Remote Control*, vol. 36, no. 8, Jan. 10, 1976, pt. 1, p. 1281-1290. Translation.

The available formal methods for studying large data arrays are oriented towards processing completely filled rectangular tables. The paper poses the problem of developing formal methods for studying tables with many entries missing. With two problems of determining the structure of an array as examples, it is shown that a numerical array with random distribution of missing entries is just as suitable as a rectangular matrix with the same number of known elements. (Author)

N78-22841# Research Inst. of National Defence, Stockholm (Sweden).
FAST MULTIVARIABLE QUERY EVALUATION
Stefan Arnborg and Per Svensson Aug. 1977 80 p refs
(FOA-C-20189-D8) Avail: NTIS HC A05/MF A01

A multivariable query is a specification of a function on all k-tuples of records in a specified subset of a database. Evaluation of such functions is usually very time-consuming. Algorithms are analyzed which evaluate multivariable queries with minimal or nearly minimal cost, where cost is I/O transfer time, I/O wait time and CPU time, respectively. Author (ESA)

N78-26810 North Carolina Univ., Chapel Hill.
TWO TOPICS IN SEMI-MARKOV PROCESSES: 1. SEMI-MARKOV PROCESSES WHICH ARE FUNCTIONS OF MARKOV CHAINS. 2. ESTIMATION OF THE PARAMETERS OF A SEMI-MARKOV PROCESS FROM AGGREGATE DATA Ph.D. Thesis
Stanley Allen Shulman 1977 228 p
Avail: Univ. Microfilms Order No. 78-07163

Both discrete-time and continuous-time semi-Markov processes are studied for the case when a finite state semi-Markov process is a function of a finite state Markov chain. Results depended on the assumed holding-time distributions for the semi-Markov process. It was also found that a finite-state Markov chain is collapsible into a semi-Markov process when the fitted semi-Markov process is a function of a Markov chain, or when the fitted Markov chain is collapsible into a semi-Markov process. The problem of estimating the parameters of a semi-Markov model from aggregate data is also considered. The results are applied to data sets based on work histories of individuals in the rubber industry. Dissert. Abstr.

N78-32181*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A PROBABILISTIC SPERNER'S THEOREM, WITH APPLICATIONS TO THE PROBLEM OF RETRIEVING INFORMATION FROM A DATA BASE
L. D. Baumert, R. J. McEliece, E. R. Rodemich, and H. Rumsey, Jr. *In its* The Deep Space Network 15 Aug. 1978 p 81-86 refs
Avail: NTIS HC A09/MF A01 CSCL 12A

The design of an optimal merged keycode data base information retrieval system is detailed. A probability distribution of n-bit binary words that minimized false drops was developed for the case where the set of desired records was a subset of tagged records. G.G.

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N76-11800# Mitre Corp., Bedford, Mass.
DOWNGRADING IN A SECURE MULTILEVEL COMPUTER SYSTEM: THE FORMULARY CONCEPT
D. F. Stork May 1975 64 p refs
(Contract F19628-73-C-0001; AF Proj. 7070)
(AD-A011696; MTR-2924; ESD-TR-75-62) Avail: NTIS CSCL 09/2

The tasks to be performed during the development of the Secure Multilevel Data Base System include the construction of a capability for the transformation of data of higher levels of classification to data at lower levels. The capability is to be part of a system in which access control is based upon a security kernel for the PDP-11/45. In this report a mechanism for facilitating downward transformations is developed, and the impact of the mechanism upon both the Bell-LaPadula model of secure computer systems and the security kernel is discussed. An expository treatment of the model and kernel is also included.
GRA

N76-12000# Naval Research Lab., Washington, D.C.
FILE PARTITIONING AND RECORD PLACEMENT IN ATTRIBUTE-BASED FILE ORGANIZATIONS Interim Report
Edwin J. McCauley and Frank A. Manola 10 Jul. 1975 15 p refs
(RF21222401)
(AD-A012937; NRL-7906) Avail: NTIS CSCL 09/2

The position occupied by a record of the data base on secondary storage can affect performance in a variety of ways. Record placement and file organization interact with one another. A model was developed for certain techniques that use the physical device characteristics and the logical file content to optimize retrieval efficiency and precision. Methods were reviewed for partitioning the file into disjoint groups of records (called clusters) such that in most cases an access to the file will involve a small number of clusters. A record placement technique that preserves these clusters was developed, followed by a search algorithm which, when this record placement policy is followed, gives improved performance in the areas of precision and efficiency. Finally, application of the techniques to existing systems was considered.
GRA

N76-16893*# Aerospace Corp., El Segundo, Calif. Advanced Mission Analysis Directorate.
SYSTEMS COST/PERFORMANCE ANALYSIS (STUDY 2.3). VOLUME 2, APPENDIX A: DATA BASE Final Report
31 Mar. 1975 395 p Supersedes ATR-74(7343)-1-Vol-1-App-A
(Contract NASw-2727)
(NASA-CR-146131; ATR-74(7343)-1-Vol-1-App-A; ATR-75(7363)-3-Vol-2-App-A) Avail: NTIS HC $10.75 CSCL 12B

Data on selected payload equipments (components) which were collected for the purpose of exercising the systems cost performance model are reported in an appendix. The reader should be aware that, although most of the data are accurate, approximations based on engineering judgment and experience are used wherever actual data were unavailable. The approximations are justified by the objective of the study which was to develop a cost/performance model. Assuming that the model is successfully developed and is accepted for use by a body of users, the data base should be expanded and the approximations replaced by actual data.
Author

N76-20832# Pattern Analysis and Recognition Corp., Rome, N.Y.
RADC ON-LINE RETRIEVAL SYSTEM EVALUATION Final Report, Jul. 1973 - Mar. 1975
John M. Morris, Clifford Carroll, and Richard Jayne Aug. 1975 117 p refs
(Contract F30602-73-C-0389; AF Proj. 4594)
(AD-A016438; PAR-75-10; RADC-TR-75-208) Avail: NTIS CSCL 09/2

This report presents the results of comprehensive statistical and operational testing of the RADCOL retrieval system. Section 1 of the report presents an overview of the system, with emphasis on retrieval methodology, and with some discussion of the effectiveness of this methodology. Section 2 describes the techniques for statistical testing which were developed especially for this project. They permit objective tests of retrieval effectiveness for large data bases, which may not permit a complete search to determine the number of documents relevant to a particular query. Section 3 presents the results of operational testing of the RADCOL system. In Section 4, the RADCOL system is compared with several standard retrieval systems, in an attempt to determine those features that might be most useful in future development of the system. Section 5 presents a more detailed discussion of possible modifications and expansions of the system, as it might be implemented in an operational environment. GRA

N76-30013# Naval Ship Research and Development Center, Bethesda, Md.
NAVLIS PILOT NETWORK EXECUTIVE CONTROL SUBSYSTEM SPECIFICATION Interim Report
B. A. Wallis and H. L. Magnan Jun. 1975 101 p refs
(AD-A022335; DTNSRDC-4735) Avail: NTIS CSCL 09/2

The Navy is engaged in the development of a Navy Logistics Information Sharing (NAVLIS) capability. This report contains the detail design specifications for the Executive Control Subsystem of the NAVLIS Pilot Network being developed to test and evaluate the NAVLIS baseline concept. These specifications will serve as a basis for the development of specifications for lower-level software and will be of interest to those persons interested in the architecture of the NAVLIS Executive Subsystem software.
GRA

N77-29008# Technology Service Corp., Santa Monica, Calif.
TOPICS IN THE ANALYSIS AND OPTIMIZATION OF COMPLEX SYSTEMS Final Report
William S. Meisel and Leo Breiman 23 Feb. 1977 63 p refs
(Contract F44620-76-C-0069; AF Proj. 2304)
(AD-A0[illegible]1209; AFOSR-77-0376TR) Avail: NTIS HC A04/MF A01 CSCL 12/2

This one-year contract was in essence a continuation of a previous five year effort. The purpose was to discover more effective methods of analyzing high dimensional data sets. The motivation was the conviction that classical methods were often inappropriate and led to misleading results. A technical paper entitled 'Variable Kernel Estimates of Multivariate Densities and Their Calibration' was accepted for publication in Technometrics. The problem treated was to estimate some unknown probability density in m variables based on n independent samples from that distribution. The solution is an extension of a method proposed by Parzen. Additional work was concerned with completing two other papers that were almost finished during the previous year in the areas of goodness-of-fit and classification methods.
Author (GRA)

N77-33946# Stanford Univ., Calif. Dept. of Computer Science.
A REVIEW OF KNOWLEDGE BASED PROBLEM SOLVING AS A BASIS FOR A GENETICS EXPERIMENT DESIGNING SYSTEM
Mark J. Stefik and Nancy Martin Mar. 1977 86 p refs
(Contract DAHC15-73-C-0435; Grants NSF MCS-76-11649; NSF MCS-76-11935; NIH-RR-00785)
(AD-A042720; SU-STAN-CS-77-596; HPP-77-5) Avail: NTIS HC A05/MF A01 CSCL 12/2

It is generally accepted that problem solving systems require a wealth of domain specific knowledge for effective performance in complex domains. This report takes the view that all domain specific knowledge should be expressed in a knowledge base. With this in mind, the ideas and techniques from problem solving and knowledge base research are reviewed and outstanding problems are identified. Finally, a task domain is characterized in terms of objects, actions, and control/strategy knowledge and suggestions are made for creating a uniform knowledge base management system to be used for knowledge acquisition, problem solving, and explanation. Author (GRA)

N80-28143# Operating Systems, Inc., Woodland, Calif.
SATELLITE AND MISSILE DATA GENERATION FOR AIS Final Technical Report, 1 Sep. 1978 - 31 Aug. 1979
Georgette M. Silva and Christine A. Montgomery Griffiss AFB, N.Y. RADC Dec. 1979 194 p refs
(Contract F30602-78-C-0274; AF Proj. 4594)
(AD-A084326; OSI-R79-037; RADC-TR-79-314) Avail: NTIS HC A09/MF A01 CSCL 09/4

The effort described specifically addressed the problem of deriving indicator and descriptor data from the narrative text portions of a class of intelligence messages dealing with events related to missile and satellite launchings used for input to the Advanced Indicator System (AIS) data base. The introductory section briefly discusses the intelligence problem which OSI's event processing technology intends to solve, summarizes the technology developed under this contract, and presents the conclusions drawn on the basis of the results obtained. Section 2 offers a summary of OSI's methodological approach to the analysis and description of event reports. This methodology, initially developed on the basis of messages dealing with air activities, was, under this contract, extended to cover reports of events involving missile and satellite launchings and related events. Section 3 describes the Missile and Satellite domains, and presents the results of their analysis in terms of a domain definition. The discussion includes a characterization of the event report in terms of its component messages; a list of the message types encountered in the domains under consideration; a list of the event types identified together with their descriptor system, and a definition of the sublanguage in terms of its vocabulary and syntax. Section 4 focuses on the implementation of OSI's message text analysis system, MATRES II. It briefly reviews the principles underlying OSI's event processing technology and offers an overview of MATRES. GRA

N80-31462*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md
INTEGRATED ANALYSIS OF LARGE SPACE SYSTEMS

Joseph P. Young *In* NASA. Lewis Research Center Large Space Systems/Low-Thrust Propulsion Technol. Jul. 1980 p 179-192
Avail: NTIS HC A15/MF A01 CSCL 12B

Based on the belief that actual flight hardware development of large space systems will necessitate a formalized method of integrating the various engineering discipline analyses, an efficient highly user oriented software system capable of performing interdisciplinary design analyses with tolerable solution turnaround time is planned Specific analysis capability goals were set forth with initial emphasis given to sequential and quasi-static thermal/structural analysis and fully coupled structural/control system analysis. Subsequently, the IAC would be expanded to include a fully coupled thermal/structural/control system, electromagnetic radiation, and optical performance analyses. A.R.H.

N80-33106# Purdue Univ., Lafayette, Ind. Krannert Graduate School of Management.
A GENERALIZED DECISION SUPPORT SYSTEM USING PREDICATE CALCULUS AND NETWORK DATA BASE MANAGEMENT
Robert H. Bonczek, Clyde W. Holsapple (Illinois Univ., Urbana), and Andrew B. Whinston Jul. 1980 38 p refs
(Contract DAAG29-79-C-0154)
(AD-A088079; ARO-16231.5-EL) Avail: NTIS HC A03/MF A01 CSCL 12/2

In view of the growing prominence of corporate modeling, an important area of research concerns techniques for facilitating the design and utilization of models. In this paper, we show how first-order predicate calculus can be used as a language for formally stating modeling knowledge. Furthermore, knowledge stated in this manner can be subjected to the resolution principle. The result is that application specific modeling knowledge need not be embedded in a computer program. Rather, it can be stored in a data base and utilized as needed by a problem processing system employing resolution techniques. Advantages of a decision support system taking an approach of this sort are considerable modeling flexibility, capacity for automating the model formulation and execution processes, and compatibility with a high-level user interface language. GRA

67 THEORETICAL MATHEMATICS

Includes topology and number theory

No abstracts in this category

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N76-32964# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTERIZED DATA BASE OF THE FUNDAMENTAL CONSTANTS OF NATURE
E. A. Henry and V. E. Hampel 3 Dec. 1975 18 p refs
(Contract W-7405-eng-48)
(UCRL-51989) Avail: NTIS HC $4.00

Fundamental constants of nature were computerized from up-to-date evaluations. The constants are annotated with regard to symbol, value, uncertainty, and scaling factor. This computerization is part of the scientific data base project of the Information Research Group at Lawrence Livermore Laboratory. The MASTER CONTROL data base management system is used. The computerized fundamental constants can be requested from the ERDA Computer Program Exchange and Information Center of the Argonne National Laboratory or from the National Technical Information Service of the U.S. Department of Commerce. ERA

N78-11797# Joint Publications Research Service, Arlington, Va.
TRANSLATIONS ON USSR SCIENCE AND TECHNOLOGY: PHYSICAL SCIENCES AND TECHNOLOGY, NO. 20
28 Oct. 1977 65 p Transl. into ENGLISH from Russian journals
(JPRS-70030) Avail: NTIS HC A04/MF A01

Topics discussed include: development prospects in the state network of computer centers, automated control systems in Uzbek, information exchange and data retrieval, scientific potential of universities, cooperation between university research and industry, and scientific progress in Kazakhstan and in Estonia. A.R.H.

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

A79-18853 * **On the tones and pressure oscillations induced by flow over rectangular cavities.** C. K. W. Tam (Florida State University, Tallahassee, Fla.) and P. W. Block (NASA, Langley Research Center, Hampton, Va.). *Journal of Fluid Mechanics*, vol. 89, Nov. 28, 1978, p. 373-399. 31 refs. Grant No. NsG-1329.

Experimental measurements of the frequencies of discrete tones induced by flow over rectangular cavities were carried out over a range of low subsonic Mach numbers to provide a reliable data base for (aircraft wheel well) cavity noise consideration. A mathematical model of the cavity tones and pressure oscillation phenomenon based on the coupling between shear layer instabilities and acoustic feedback is developed to help in understanding the tone generation mechanism. Good agreement is found between discrete tone frequencies predicted by the model and experimental measurements over a wide range of Mach numbers. Evidence of tones generated by the cavity normal mode resonance mechanism at very low subsonic Mach numbers is also presented. (Author)

N75-16315*# Aerophysics Research Corp., Hampton, Va.
PREDICTION OF SONIC BOOM FROM EXPERIMENTAL NEAR-FIELD OVERPRESSURE DATA. VOLUME 1: METHOD AND RESULTS Final Report
C. R. Glatt, D. S. Hague, and S. J. Reiners Washington NASA Feb. 1975 78 p refs
(Contract NAS1-12579)
(NASA-CR-2441) Avail: NTIS HC $4.75 CSCL 20A

A computerized procedure for predicting sonic boom from experimental near-field overpressure data has been developed. The procedure extrapolates near-field pressure signatures for a specified flight condition to the ground by the Thomas method. Near-field pressure signatures are interpolated from a data base of experimental pressure signatures. The program is an independently operated ODIN (Optimal Design Integration) program which obtains flight path information from other ODIN programs or from input. Author

N77-10087# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
DATA BASE FOR PREDICTING NOISE FROM CIVIL AIRCRAFT: FLIGHT PROFILE PREDICTION
William J. Galloway, John F. Mills, and Anthony B. Hays Mar. 1976 64 p refs
(Contract EPA-68-01-2265)
(PB-257628/7; BBN-2746) Avail: NTIS HC A04/MF A01 CSCL 01B

A method for calculating flight profiles for any conventional fixed wing aircraft operating condition likely to occur in the vicinity of an airport is described, and performance parameters are provided for aircraft operating in the U.S. civil fleet. The method uses certain simplifying assumptions for ease of computation, but provides adequate accuracy for predicting of the noise exposure produced by a complex set of operations around an airport. GRA

DATA SUMMARY Jet and propeller aircraft performance, variables include altitude, distance, thrust, flap setting, landing weight, engine pressure ratio. 1 figure and 4 tables include numeric data.

N77-29919# Federal Aviation Administration, Washington, D.C.
HELICOPTER NOISE MEASUREMENTS DATA REPORT. VOLUME 1: HELICOPTER MODELS: HUGHES 300-C, HUGHES 500-C, BELL 47-G, BELL 206-L
Harold C. True and Richard M. Letty Apr. 1977 386 p 2 Vol.
(AD-A040561; FAA-RD-77-57-Vol-1) Avail: NTIS HC A17/MF A01 CSCL 01/3

The purpose of this test program was to provide a data base for a possible helicopter noise certification rule. Only the measured data is presented. The eight helicopters tested during this Helicopter Noise Test Program constituted a wide range of gross weights and included participation from several helicopter manufacturers. The helicopter models used in this test program were the Hughes 300C, Hughes 500C, Bell 47-G, Bell 206-L, Bell 212 (UH-1N), Sikorsky S-61 (SH-3A), Sikorsky S-64 Skycrane (CH-54B), and Boeing Vertol Chinook CH-47C. The test procedure for each helicopter consisted of obtaining noise data during hover, level flyover, and approach conditions. The data consist of time histories, 1/3-octave band spectra, EPNL, PNL, dBA, dBD and OASPL noise levels. Author

N77-29920# Federal Aviation Administration, Washington, D.C.
HELICOPTER NOISE MEASUREMENTS DATA REPORT. VOLUME 2: HELICOPTER MODELS: BELL 212 (UH-IN), SIKORSKY S-61 (SH-3A), SIKORSKY S-64 SKYCRANE (CH-54B), BOEING VERTOL CHINOOK (CH-47C)
Harold C. True and Richard M. Letty Apr. 1977 418 p 2 Vol.
(AD-A040562; FAA-RD-77-57-Vol-2) Avail: NTIS HC A18/MF A01 CSCL 01/3

For abstract, see N77-29919

N79-10014*# MAN-Acoustics and Noise, Inc., Seattle, Wash.
A COMMERCIAL AIRPORT NOISE ENVIRONMENT: MEASUREMENT, PREDICTION AND CONTROL Final Report
J. E. Mabry and B. U. Sullivan Feb. 1979 72 p refs
(Contract NAS1-14404)
(NASA-CR-3107; MAN-1023-B) Avail: NTIS HC A04/MF A01 CSCL 20A

The data for a commercial airport noise measurement program included approximately 1,100 calibrated tape recordings at three observer positions and some 1500 supplementary peak level measurement at ten additional measurement points. For some individual airplane categories, there were substantial differences between results based on state-of-the-art noise prediction technology and those based on actual measurements. Certain takeoff procedures resulted in significant noise reductions for particular airplane types. Also, there was some evidence that specific categories of airplanes can be flown with reduced ranges of peak noise levels. Author

N79-32064*# Boeing Vertol Co., Philadelphia, Pa.
STUDY OF DESIGN CONSTRAINTS ON HELICOPTER NOISE
Harry Sternfeld, Jr. and Carl W. Wiedersum Jul. 1979 91 p refs
(Contract NAS1-15226)
(NASA-CR-159118) Avail: NTIS HC A05/MF A01 CSCL 20A

A means of estimating the noise generated by a helicopter main rotor using information which is generally available during the preliminary design phase of aircraft development is presented. The method utilizes design charts and tables which do not require an understanding of acoustical theory or computational procedures in order to predict the perceived noise level, a weighted sound pressure level, or C weighted sound pressure level of a single hovering rotor. A method for estimating the effective perceived noise level in forward flight is also included. In order to give the designer an assessment of the relative rotor performance, which may be traded off against noise, an additional chart for estimating the percent of available rotor thrust which must be expended in lifting the rotor and drive system, is included as well as approach for comparing the subjective acceptability of various rotors once the absolute sound pressure levels are predicted. A.R.H.

N80-34217*# Sikorsky Aircraft, Stratford, Conn.
AN EVALUATION OF A COMPUTER CODE BASED ON LINEAR ACOUSTIC THEORY FOR PREDICTING HELICOPTER MAIN ROTOR NOISE Final Report
S. Jon Davis and T. Alan Egolf Jul. 1980 290 p refs
(NASA-CR-159339; SER-510038) Avail: NTIS HC A13/MF A01 CSCL 20A

Acoustic characteristics predicted using a recently developed computer code were correlated with measured acoustic data for two helicopter rotors. The analysis, is based on a solution of the Ffowcs-Williams-Hawkings (FW-H) equation and includes terms accounting for both the thickness and loading components of the rotational noise. Computations are carried out in the time domain and assume free field conditions. Results of the correlation show that the Farassat/Nystrom analysis, when using predicted airload data as input, yields fair but encouraging correlation for the first 6 harmonics of blade passage. It also suggests that although the analysis represents a valuable first step towards developing a truly comprehensive helicopter rotor noise prediction capability, further work remains to be done identifying and incorporating additional noise mechanisms into the code A.R.H.

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra

N76-14908# Science Applications, Inc., Ann Arbor, Mich.
HIGH RESOLUTION SPECTRAL SURVEY OF MOLECULAR ABSORPTION IN THE DF LASER REGION: MEASUREMENTS AND CALCULATIONS Interim Technical Report, 1 Aug. 1974 - 1 Feb. 1975
Douglas Woods, Robert Meredith, Frederick Smith, and Thomas Tuer Jul. 1975 102 p refs
(Contract F30602-75-C-0028; ARPA Order 1279; AF Proj. 1279)
(AD-A013736; RADC-TR-75-180) Avail: NTIS CSCL 07/4

The investigation has a threefold objective: (1) Provide the data base from which predictive laser propagation modeling parameters can be extracted, (2) identify and quantify inadequacies in the current modeling parameters, and (3) determine the sensitivity of altitude and meteorological scaling to the modeling parameters. All three of these objectives are addressed in this interim report. The impact of predictive analysis on temperature and altitude scaling is discussed. The propagation of the P(1)(9) and P(3)(8) DF lines are predicted as specific examples of the nature of the altitude and temperature scaling problem. Also studied were spectral measurements on HDO, CH4 and N2O. Line absorption are presented and comparisons are made with current predictive calculations (i.e., synthetic spectra). A specific application to P(1)(7) propagation is discussed in the context of the HDO measurements. GRA

N76-33989# Battelle Pacific Northwest Labs., Richland, Wash.
EVALUATION OF THE NEUTRON CROSS SECTIONS OF U-235 IN THE THERMAL ENERGY REGION Final Report
B. R. Leonard, Jr., D. A. Kottwitz, and J. K. Thompson Feb. 1976 111 p refs Sponsored by Elec. Power Res. Inst.
(PB-253718/1; EPRI/NP-167) Avail: NTIS HC $5.50 CSCL 20H

The knowledge of the thermal cross sections of the fissile nuclei was improved, as a step toward providing a standard data base for the nuclear industry. A methodology was developed to perform objective studies to determine best estimate shapes of the partial cross sections in the thermal neutron energy region. Some of the results include: (1) the assessment of the shape uncertainties of the partial cross sections, (2) the development of a recommended set of 2200 m/s (0.0253 eV) values of the parameters and the probable range of further adjustment which might be made, and (3) normalization factors for relative fission and capture cross sections on a common basis with rigorous error estimates. GRA

N77-25926# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTERIZATION OF ATOMIC LEVEL AND TRANSITION DATA FOR THE FIRST AND SECOND IONIZATION STATES OF THE ELEMENTS HYDROGEN THROUGH PHOSPHORUS
E. A. Henry 6 Oct. 1976 15 p refs
(Contract W-7405-eng-48)
(UCRL-52148) Avail: NTIS HC A02/MF A01

A computerized data base of atomic energy levels and atomic transition data was developed from data published by the National Bureau of Standards. These data are of potential use for laser application. The MASTER CONTROL data-base management system is used. ERA

N78-16783# California Univ., Livermore. Lawrence Livermore Lab.
TIME FOR ATOMIC AND MOLECULAR DATA BASES IS NOW (AN OVERVIEW OF DATA MANAGEMENT RESEARCH AT LLL)
V. E. Hampel and E. A. Henry 1 Feb. 1977 47 p refs Presented at the Advisory Group Meeting on Atomic and Molecular Data for Fusion, Abingdon, Oxfordshire, United Kingdom of Great Britain and Northern Ireland, 1 Nov. 1976
(Contract W-7405-eng-48)
(UCRL-79286; Conf-761123-4) Avail: NTIS HC A03/MF A01

Numerical data bases of atomic and molecular (A and M) data required for laser-induced fusion studies were created. One file contains primarily atomic energy levels and atomic transition data released by Charlotte E. Moore in NBS publications. The second file is based on the spectroscopic constants for more than 1000 molecular levels of approximately 180 heteronuclear diatomic molecules prepared by S. N. Suchard. Additional data bases are contemplated in support of the accelerating research activities in these fields. The present paucity of authenticated, computer-readable A and M data is not unlike that observed two decades ago in nuclear fission research. ERA

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles, and reactor theory.

For space radiation see *93 Space Radiation*.

N76-14886# Science Applications, Inc., La Jolla, Calif.
MODELS OF PHOTON RADIATION IN AIR Final Report, 10 Apr. 1970 - 31 Mar. 1974
William A. Woolson, Louis Huszar, and Robert J. Harris, Jr. Sep. 1974 63 p refs
(Contract DASA01-70-C-0090; DNA Proj. NWED-QAXP)
(AD-784956; SAI-73-629-LJ; DNA-3279T) Avail: NTIS CSCL 18/8

A data base of photon transport in air for energies extending from 10 keV to 10 MeV was generated for parametric modeling for the ATR code. The data base was generated in two separate units: one for gamma-ray problems which has 18 energy groups from .02 MeV to 10 MeV, and the other, for x-ray problems which has 18 energy groups from 10 keV to 300 keV. The gamma-ray energy group structure is identical to the group structure for the secondary photons of the neutron ATR data base, thus allowing one to use ATR to obtain results for a complete neutron and gamma-ray radiation source problem. The x-ray data base was geared toward the special problems of obtaining accurate transport calculations for sources in the x-ray energy region. GRA

N76-20954# Oak Ridge National Lab., Tenn.
NUCLEAR STRUCTURE DATA FILE: A MANUAL FOR PREPARATION OF DATA SETS
W. B. Ewbank, M. R. Schmorak, F. E. Bertrand, M. Feliciano, and D. J. Horen Jun. 1975 34 p
(Contract W-7405-eng-26)
(ORNL-5054) Avail: NTIS HC $4.00

The Nuclear Data Project is building a computer-based file of nuclear structure data, which is intended for use by both basic and applied users. For every nucleus, the Nuclear Structure Data File contains evaluated nuclear structure information. This manual describes a standard input format for nuclear structure data. The format is sufficiently structured that bulk data can be entered efficiently. At the same time, the structure is open-ended and can accommodate most measured or deduced quantities that yield nuclear structure information. Computer programs have been developed at the Data Project to perform consistency checking and routine calculations. Programs are also used for preparing level scheme drawings. NSA

N78-25888# Brookhaven National Lab., Upton, N. Y.
REFERENCE NUCLEAR DATA FOR SPACE TECHNOLOGY
T. W. Burrows and N. E. Holden 1977 11 p refs Presented at the Am. Nucl. Soc. 1977 Winter Meeting, San Francisco, 27 Nov. - 2 Dec. 1977
(Contract EY-76-C-02-0016)
(BNL-NCS-23556; Conf-771109-89) Avail: NTIS HC A02/MF A01

Specialized bibliographic searches, data compilations, and data evaluations help the basic and applied research scientist in his work. The National Nuclear Data Center (NNDC) collates and analyzes nuclear physics information, and is concerned with the timely production and revision of reference nuclear data. A frequently revised reference data base in computerized form has the advantage of large quantities of data available without publication delays. The information normally handled by coordinated efforts of NNDC consists of neutron, charged-particle, nuclear structure, radioactive decay, and photonuclear data. ERA

74 OPTICS

Includes light phenomena

N77-25947# Institute for Defense Analyses, Arlington, Va. Science and Technology Div.
ATMOSPHERIC TRANSMISSION MODELING: PROPOSED AEROSOL METHODOLOGY WITH APPLICATION TO THE GRAFENWOEHR ATMOSPHERIC OPTICS DATA BASE Final Report
Robert E. Roberts Dec. 1976 32 p refs
(Contract DAHC15-73-C-0200)
(AD-A035765; P-1225; IDA/HQ-76-18603) Avail: NTIS HC A03/MF A01 CSCL 20/6

Using Mie calculations for a wide variety of measured and assumed particle size distributions, a strong relationship between the total volume content of the particulate along the transmission path and the aerosol extinction coefficient was established. Field measurements, such as those taken at Grafenwoehr, Federal Republic of Germany, further established the validity of the relationship. Both theory and experiment suggest that a phenomenological scaling of photopic transmission related to normal meteorological visibility to the infrared IR windows is possible which furthermore is independent of the structure or shape of the particle size distribution. A second important implication is that a simple, possibly remote measurement of a quantity related to the volume or mass of the aerosol could provide a direct measure of the IR transmission, an IR visibility meter. Such a routine meteorological measurement would clearly be of use to sensor performance modeling. Author (GRA)

N79-15782# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.
PROTOTYPE AUTOMATIC TARGET SCREENER Quarterly Progress Report, 1 Apr. - 30 Jun. 1978
D. E. Soland, P. M. Narendra, R. C. Fitch, D. V. Serreyn, and T. G. Kopet Sep. 1978 110 p
(Contract DAAK70-77-C-0248; DA Proj. 1E2-63710-DK-70)
(AD-A060850; HONEYWELL-78SRC54-3; QPR-3) Avail: NTIS HC A06/MF A01 CSCL 17/5

This report is the third quarterly progress report for contract DAAK70-77-C-0248, Prototype Automatic Target Screener. The objective of the effort is to design an automatic target screener to be used with thermal imaging systems employing common module components. Author (GRA)

N79-20880*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MERGED INFRARED CATALOGUE
M. Schmitz (Computer Sciences Corp., Silver Spring, Md.), L. W. Brown, J. M. Mead, and T. A. Nagy (Computer Sciences Corp., Silver Spring, Md.) Nov. 1978 334 p
(NASA-TM-79683) Avail: NTIS HC A15/MF A01 CSCL 20F

A compilation of equatorial coordinates, spectral types, magnitudes, and fluxes from five catalogues of infrared observations is presented. This first edition of the Merged Infrared Catalogue contains 11,201 observations from the Two-Micron Sky Survey, Observations of Infrared Radiation from Cool Stars, the Air Force Geophysics Laboratory four Color Infrared Sky Survey and its Supplemental Catalog, and from Catalog of 10 micron Celestial Objects (HALL). This compilation is a by-product of a computerized infrared data base under development at Goddard Space Flight Center; the objective is to maintain a complete and current record of all infrared observations from 1 micron m to 1000 micron m of nonsolar system objects. These observations are being placed into a standardized system. Author

N79-22788# Technology Service Corp., Santa Monica, Calif.
DATA BASE DESCRIPTORS FOR ELECTRO-OPTICAL SENSOR SIMULATION Final Report, May 1977 - Jun. 1978
Timothy A. Zimmerlin, George J. Sutty, and Anthony J. Stenger Feb. 1979 77 p refs
(Contract F33615-77-C-0049)
(AD-A065043; AFHRL-TR-78-86) Avail: NTIS HC A05/MF A01 CSCL 20/6

The purpose of this study is to investigate the use of the Defense Mapping Agency Aerospace Center (DMAAC) digital source data for simulation of Forward Looking Infrared (FLIR) and Low Light Level Television (LLLTV) sensor imagery during various periods of the day and seasons of the year. This includes determination of deficiencies of the DMAAC data base which limit its us as well as identification of additional parameters which would increase its utility for sensor simulation. The approach taken in the study was to determine what information is required of the scene, its environment, and the sensor and to generate realistic imagery from it. Then imagery using lesser amounts of data can be generated for various user applications. The impact on the data base can then be assessed for a given application and level of detail in the imagery. The results of this study include a realistic tonal model for the simulation of passive sensor imagery of complex cultural scenes, the generation of imagery from a scene constructed according to the DMAAC specifications, an assessment of the resultant diurnal and seasonal imagery, and the relationship between the model data requirements and the resources of the data base. Author (GRA)

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N79-10004# Science Applications, Inc., La Jolla, Calif.
ASSESSMENT OF THE TOKAMAK CONFINEMENT DATA BASE Final Report
R. E. Aamodt, R. N. Byrne, H. Fleischmann, K. W. Gentle, N. A. Krall, R. J. Taylor, and A. W. Trivelpiece Mar. 1978 119 p refs Sponsored by EPRI
(EPRI-ER-714) Avail: NTIS HC A06/MF A01

The results of an early 1977 survey of the Tokamak physics data base are discussed. The important Tokamak physics characteristics necessary for developing a fusion reactor were identified. An overview of the state of the present Tokamak fusion reactor program was given, and suggestions on the expansion of the data base were discussed. The mirror fusion reactor program is included. DOE

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

N79-17806# Oregon Graduate Center for Study and Research, Beaverton.
FIELD ELECTRON AND ION SOURCE RESEARCH FOR HIGH DENSITY INFORMATION STORAGE SYSTEM Interim

Technical Report, 16 Aug. - 16 Nov. 1976
L. W. Swanson, A. E. Bell, J. Orloff, and G. A. Schwind May 1977 102 p refs
(Contract F33615-76-C-1327)
(AD-A048043; AFAL-TR-77-82; ITR-2) Avail: NTIS
HC A06/MF A01 CSCL 20/3

The purpose of this research program is the development of high brightness field emission sources of both ions and electrons by use of field emission phenomena. In this report we concentrate on the liquid alloy (Ga/In (10%)) source. Both ion and electron emission results are reported along with analysis of the effect of various source configuration on its performance. The angular distribution has been measured for ion emission in a qualitative fashion and gives an angular intensity between 60 to 300 microns A/sr. The electron emission exhibits only a pulse mode of width approximately 10 nsec and amplitude approximately 100 A. A much larger angular distribution of the pulsed electron beam was observed in the electron mode. Author (GRA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

A80-34019 # **Establishment of a computer data base on geothermal properties of aqueous NaCl, KCl and CaCl2 solutions.** J. A. Fair and S. L. Phillips (California, University, Berkeley, Calif.). *CODATA Bulletin*, no. 23, May 1977, p. 15-21; Discussion, p. 21, 22. 13 refs. ERDA-supported research.

A National Geothermal Information Resource (GRID) has been established with the objective to compile and disseminate evaluated data on geothermal science and technology, including the physical chemistry category. The data base for aqueous solutions includes enthalpy, heat capacity, activity coefficient, osmotic coefficient, PVTX, viscosity, thermal conductivity, and electrical conductivity. A bibliography of references to this data, which currently contains 1100 citations, is annotated and stored on magnetic tape for quick retrieval. The bibliography covers the properties of aqueous solutions of NaCl, KCl, and CaCl2 from 1965 to January 1976. The citations are input into a hierarchically structured computerized data base. Typical examples of brine data are presented. V.L.

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

A76-20887 * **Utilization of remote sensing data - The sociological perspective.** I. R. Hoos (California, University, Berkeley, Calif.). *Photogrammetric Engineering and Remote Sensing*, vol. 42, Feb. 1976, p. 201-210. 32 refs. Grant No. NGL-05-003-404.

Remote sensing provides an opportunity to study the ways in which new sources of data enter into decisions related to resource management, the conditions and criteria for acceptance of the new techniques, and the methods by which assessment of their utility is accomplished. This article underscores the social dimensions of technology utilization and assessment, with reliability, specificity, ease of access, and openness among the main desiderata. The point is made that the interface between the technology and the society it is designed to serve is crucial, for upon its nature depend how, whether, when, and by whom the technology will be utilized. The present reliance on quantitative techniques, such as benefit-cost analyses, is reviewed from a sociological view point, and the inadequacy of these techniques is pointed out. (Author)

A78-43884 **Space sociology, a terrestrial perspective - Public perceptions of the space program.** A. Rudoff. In: The industrialization of space; Proceedings of the Twenty-third Annual Meeting, San Francisco, Calif., October 18-20, 1977.
San Diego, Calif., American Astronautical Society; Univelt, Inc., 1978. 14 p. 33 refs. (AAS 77-288)

A role for sociology in the space program is suggested and the literature with sociological pertinence reviewed. Focusing on space communities, a plan for developing a data base for the social construction of a prototypical space community is outlined. One aspect of this plan is to assess public perceptions of the space program in general and space communities in particular. A questionnaire was constructed to cover four areas of inquiry: demographic background, familiarity with the space program, public support, and perceptions of a viable space settlement. A sample of university students and faculty was assessed. The results indicated a disparate familiarity with the space program and a general support for a low level effort with particular emphasis on projects with terrestrial pay-offs. (Author)

N77-28021# Management Technology, Inc., Berkeley, Calif. Career Projects Div.
CAREER GUIDANCE FOR SCIENCE STUDENTS: SYSTEMS, PRACTICES AND DATA BASE Final Report, 1 Nov. 1974 - 31 Dec. 1975
Margaret Thal-Larsen and Gerald R. Parrish Dec. 1975 266 p refs
(Grant NSF EPP-74-20284)
(PB-264517/4; MT-NSF-75-02) Avail: NTIS
HC A12/MF A01 CSCL 05I

The following is provided: (1) a resume of theories underlying career guidance, (2) an overview of guidance practices and materials, (3) the relationship of career guidance to career education, (4) a comparative treatment of major computerized career guidance systems, and (5) discussion of several shortcomings in the data base and delivery methods utilized by these and the more conventional systems. GRA

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

A75-12245 # **Man as manager of automated resources in an advanced air traffic system.** L. L. Jenney (Planar Corp., Alexandria, Va.) and R. S. Ratner (Stanford Research Institute, Menlo Park, Calif.). *AIAA, DOT, and NASA, Life Sciences and Systems Conference, Arlington, Tex., Nov. 6-8, 1974, AIAA Paper 74-1292.* 10 p. 6 refs.

Questions are explored concerning the nature of man's participation in a future ATC system in which much of the routine operation has been delegated to machine resources. In future ATC systems the degree of man's direct involvement with individual aircraft will be greatly diminished, and his concerns will shift towards information management and process control. The operational role of man in current and future systems is discussed along with his managerial role and questions of reliability and performance assurance. G.R.

A76-43106 # **Using pattern recognition in an industrial environment.** R. A. Hughes, H. E. Rauch, and M. A. Fischler (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.). *American Institute of Aeronautics and Astronautics and American Astronautical Society, Astrodynamics Conference, San Diego, Calif., Aug. 18-20, 1976, AIAA Paper 76-802.* 12 p. 8 refs.

Overview of the methods and experience gained in applying pattern recognition concepts and techniques to exploratory data analysis and decision making for real problems in an industrial environment. The tools described here include conventional statistical analysis, discrimination or classification (Fisher linear dis-

[illegible]), hypothesis generation (minimum spanning tree clustering and centroid clustering), data display (two-dimensional projections), and data base handling and interactive graphics capability. These tools act as hypothesis generators in that they provide insight that is not normally available from conventional mathematical and statistical analysis of data. (Author)

A77-26487 * # **The ABC's required for establishing a practical computerized plant engineering management data base system.** F. R. Maiocco and J. P. Hume (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *American Society of Mechanical Engineers, Winter Annual Meeting, New York, N.Y., Dec. 5-10, 1976, Paper 76-WA/PEM-1.* 5 p. Members, $1.50; nonmembers, $3.00. Contract No. NAS7-100.

A system's approach is outlined in the paper to assist facility and Plant Engineers improve their organization's data management system. The six basic steps identified may appear somewhat simple; however, adequate planning, proper resources, and the involvement of management will determine the success of a computerized facility management data base. Helpful suggestions are noted throughout the paper to insure the development of a practical computerized data management system. (Author)

A77-50456 **Reliability, availability, maintainability/logistics /RAM/LOG/.** L. L. Bishop, T. A. Cronogue, R. Hoffman, D. Reside, G. Donald, and R. Flynn (U.S. Army, Aviation Systems Command, St. Louis, Mo.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 49-68.

The paper covers various aspects of the reliability, availability, maintainability/logistics (RAM/LOG) methodology of the U.S. Army Aviation for development aircraft. RAM/LOG data acquisition, processing and computation, and assessment are described. P.T.H.

A78-14404 **Problems in contracting for system safety.** L. E. Rackley and G. H. Lemon (General Dynamics Corp., Fort Worth, Tex.). In: SAFE Association, Annual Symposium, 15th, Las Vegas, Nev., December 5-8, 1977, Proceedings. Canoga Park, Calif., SAFE Association, 1977, p. 13-16.

Fault tree analysis is the method used for system hazard analysis, for assessing the safety level of the development aircraft and for predicting the safety level of the production aircraft at maturity. Source data for the fault tree logic diagrams are accumulated with the Subsystem Hazard Analysis (SSHA) program. Hazard analysis data are purchased from subcontractors. The Preliminary Hazard Analysis (PHA) identifies hazards in equipment and the Operating Hazard Analysis (OHA) identifies hazards in software and written instructions. One of the problems encountered in contracting for system safety is related to the failure of some subcontractors to properly identify 'command' failures. Another problem is connected with the failure to identify all part failure modes. G.R.

A80-40323 **Triple tracking growth.** D. J. Simkins (IBM Corp., Federal Systems Div., Owego, N.Y.). In: Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 158-163.

This paper describes the practical ramifications of Reliability Growth Management approaches with emphasis on a triple tracking approach management/technical approach as opposed to primarily a mathematical approach. The paper also discusses 'real world' construction of the instantaneous (current) MTBF target curve and cumulative MTBF target curves depending on how the fixes are to be incorporated. Also examined are case histories involving out-of-tolerance conditions that were identified through the triple tracking system. Finally, software tracking and Bayesian techniques are discussed. The paper focuses on the development phase and the equipment level analysis except for software tracking. (Author)

N75-30820*# Aerospace Corp., El Segundo, Calif. Advanced Orbital Systems Div.
SYSTEMS COST/PERFORMANCE ANALYSIS (STUDY 2.3). VOLUME 2, APPENDIX A: DATA BASE Final Report
B. H. Campbell 27 Sep. 1974 383 p
(Contract NASw-2575)
(NASA-CR-143389; ATR-74(7342)-1-Vol-2-App-A) Avail: NTIS HC $10.25 CSCL 05A

Data are presented on selected payload equipments (components) which were collected for the purpose of exercising the systems cost/performance model. Although most of the data is accurate, approximations based on engineering judgment and experience are used wherever actual data was unavailable. The equipments are organized according to the following subsystems which use the specific components: stabilization and control, auxiliary propulsion, data processing, communication, and electrical power. The data sheet for each component states which subsystem utilizes the component, which configurations require the component, which equipment type the component is categorized as, and the data base identifier or code number assigned to the component. The data describing the component consist of the following four types: performance, safety, cost, and schedule. Author

N76-10003# Defense Supply Agency, Alexandria, Va. Office of the Assistant Director Plant Programs and Systems.
COMPENDIUM OF INVENTORY CONTROL POINT MANAGEMENT INFORMATION. VOLUME 1: MANAGEMENT DATA
Nov. 1974 274 p
(AD-A011140) Avail: NTIS CSCL 15/5

The study develops a data base that will enable top management in the DoD to compare ICP primary operating costs and evaluate the relative efficiency of each ICP in the performance of material management functions. The study collects ICP management data which portrays the ICPs' mission and functions, organization, organizational relationships, and location, size, personnel authorizations, workload, productivity, resource allocation and consumption; unit costs, performance, and goals, standards, and objectives. The ICP management data are then analyzed to determine compatibility and comparability, and to identify causal relationships which exist between workload, resources, and performance. The data are presented in a manner which will facilitate its review and analysis by the Office of the Secretary of Defense. GRA

N76-10004# Defense Supply Agency, Alexandria, Va. Office of the Assistant Director Plans Programs and Systems.
COMPENDIUM OF INVENTORY CONTROL POINT MANAGEMENT INFORMATION. VOLUME 2: APPENDICES
Nov. 1974 106 p
(AD-A011141) Avail: NTIS CSCL 15/5

The purpose of the study is to develop a data base that will enable top management in the DoD to compare ICP primary operating costs and evaluate the relative efficiency of each ICP in the performance of material management functions. GRA

N76-21017# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
THE IDENTIFICATION OF A PRECEDENCE NETWORK ASSOCIATED WITH BASE LEVEL AIRCRAFT MAINTENANCE M.S. Thesis
Clark D. Hubbard and Charles R. Lindke Aug. 1975 157 p refs
(AD-A016389; SLSR-12-75B) Avail: NTIS CSCL 15/5

The objective of this study was to develop a method of identifying precedence networks associated with aircraft maintenance that is more efficient than totally relying on the memory and experience of mechanics in the field. A precedence network is the sequence in which tasks should be performed because of their interdependencies. An example of this type of dependency would be the necessity to repair a fuel cell before refueling an aircraft. This research involved the use of the Logistic Composite Model (L-COM) developed by Headquarters, Air Force Logistics Command and the Rand Corporation, the F-4E data base which had been constructed as part of Headquarters, Tactical Air Command's L-COM Study, and Maintenance Data Collection System records for F-4E aircraft. GRA

N76-32045# Signals Research and Development Establishment, Christchurch (England).
INTERFACING A DATABASE MANAGEMENT SYSTEM TO CORAL
H. K. Nichols Jul. 1975 16 p ref
(SRDE-75015; BR49042) Avail: NTIS HC $3.50

A Database Management System (DBMS) is described in which the data is held in packed format, and consists of a number of record occurrences, each occurrence containing several data fields and indexed via a unique field value. The DBMS provides a number of functions which can operate on the data. These functions provide the means by which applications programs, which are written in CORAL, gain access to the data on the backing store. A considerable amount of protection is afforded by the DBMS, in that an applications program may only use those functions that it needs and may only reference those fields with which it is directly concerned. In addition, the access to any permitted field can be further constrained, to, for example 'Read only'. The data structures, defined within the CORAL applications program, through which the DBMS provides and accepts actual data values, are discussed, and the mapping between these and the backing store structures together with the implementation of the protection mechanism described. Possible advantages offered by enhancements to the CORAL 66 compiler are discussed. Author (ESA)

N76-32048# Pennsylvania Univ., Philadelphia.
DAISY: A DECISION-AIDING INFORMATION SYSTEM Interim Report
E. G. Hurst, Jr., H. L. Morgan, and D. N. Ness 22 Jan. 1975 21 p refs
(Contract N00014-67-A-0216-0035; NR Proj. 049-331; NR Proj. 049-360)
(AD-A020647; Rept-75-01-05) Avail: NTIS CSCL 12/1

DAISY is an information and modelling system designed to aid persons making complex interconnected sequences of decisions. Decision processes such as tactical planning, military planning, or organizational planning and control are all examples of situations where DAISY can aid the decision maker. A few of its main features include the following: (a) dynamic check-list of decisions which need to be made at a given time; (b) access to a large data base of information; (c) ability to run management science models using current information to support decision making; and (d) the ability to specify conditions about which the decision maker wishes notification (e.g., ship within range of weaponry). All of these are embedded in a powerful interactive computer system. This system integrates the many functions often performed by several computer or manual systems and puts all of the power of these systems at the decision maker's fingertips. DAISY can be used in the following operating modes: (1) for training individuals in a particular complex decision process; (2) for aiding in the planning of a decision process which may have to take place (such as military scenarios); or (3) actually operating in the complex decision environment. GRA

N77-10302*# Texas Univ., Austin.
DATA MANAGEMENT IN ENGINEERING
J. C. Browne *In* NASA. Langley Res. Center Advan. in Eng., Sci., Vol. 2 1976 p 779-789 refs

Avail: NTIS HC A20/MF A01

An introduction to computer based data management is presented with an orientation toward the needs of engineering application. The characteristics and structure of data management systems are discussed. A link to familiar engineering applications of computing is established through a discussion of data structure and data access procedures. An example data management system for a hypothetical engineering application is presented. Author

N77-14926# Naval Postgraduate School, Monterey, Calif.
DESIGN CONSIDERATIONS FOR IMPLEMENTING A SHIPBOARD COMPUTER SUPPORTED COMMAND MANAGEMENT SYSTEM M.S. Thesis
Patrick Anthony Callahan Jun. 1976 51 p refs
(AD-A027290) Avail: NTIS HC A04/MF A01 CSCL 05/1

This report outlines an approach for the implementation of a shipboard computer supported management information system. The physical design specifications and design philosophy are investigated. The application of mini-computer technology applied to the shipboard environment is presented. Specific administrative functions are recommended for automation. Author (GRA)

N77-16928# Wisconsin Univ., Madison. Mathematics Research Center.
A STUDY OF BUFFER MANAGEMENT POLICIES FOR DATA MANAGEMENT SYSTEMS
Allen Reiter Mar. 1976 26 p refs
(Contract DAAG29-75-C-0024)
(AD-A027890; MRC-TSR-1619) Avail: NTIS HC A03/MF A01 CSCL 09/2

Using a simulation model, several buffer assignment algorithms were investigated experimentally. A simple least-recently-used (LRU) technique was compared with one which took into account the type of data and the number of current users (DS). Also investigated was the use of anticipatory fetching. Performance as a function of the number of available buffers was measured for each strategy. For the application and job mix in question it turns out that anticipatory fetching does not pay, and that DS in general behaves somewhat better than LRU. GRA

N77-16929# Wisconsin Univ., Madison. Mathematics Research Center.
SIMULATING A VIRTUAL DATA MACHINE

Allen Reiter and Barry Finkel May 1976 59 p refs
(Contract DAAG29-75-C-0024)
(AD-A027894; MRC-TSR-1626) Avail: NTIS
HC A04/MF A01 CSCL 09/2

The design of a program for detailed simulation modelling of generalized data management systems is described. The input to the program is a collection of process descriptions ('jobs') as sequences of block-oriented operations in a virtual data machine. The program accomplishes the binding onto a real hardware configuration, simulates the operation of a real multiprogrammed computer, and collects performance data. The design is meant to facilitate experimentation with execution-time tactics such as core management, disk scheduling, prefetching, and others. The framework accommodates a variety of computer architectures. GRA

N77-17927# Naval Postgraduate School, Monterey, Calif.
AN IMPLEMENTATION OF A CODASYL BASED DATA BASE MANAGEMENT SYSTEM UNDER THE UNIX OPERATING SYSTEM M.S. Thesis
John Edward Howard Jun. 1976 168 p
(AD-A028893) Avail: NTIS HC A08/MF A01 CSCL 09/2

This thesis reports the implementation of a Data Base Management System (DBMS) based on the CODASYL design. The DBMS was implemented on a DEC PDP 11/50 computer utilizing the UNIX operating system. Background material includes a discussion of data base history and techniques, design of UNIX and the C programming language. The research performed was the adaptation of the CODASYL DBMS design to the UNIX environment and the design of a C language Data Description Language (DDL) and Data Manipulation Language (DML) to interface the DBMS to user programs. Conclusions and recommendations for improvements are also included. Author (GRA)

N77-18942# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
THE WRM INFORMATION SYSTEM M.S. Thesis
Dennis A. Carlson and Carlos M. Talbott, Jr Jun. 1976 185 p refs
(AD-A030242; SLSR-15-76A) Avail: NTIS HC A09/MF A01 CSCL 05/1

In this research, an information system was developed which analyzes MAJCOM WRM data files. The system manipulates data in the RCS: HAF LGS (M) 7107 report and the WCDO, WMP-V, and 2C data files to provide overage and shortage inventory information. Further, it provides an ability to compute WRM requirements for any unplanned contingency force and to compare those requirements with on-hand status information. The FORTRAN program was written to investigate the following research hypothesis: given changes in a USAF general war or contingency plan, the responce time in determining the adjustments to be made in WRM stockpiles can be reduced by automated analysis of WRM data files. Statistical and operational evaluations supported this hypothesis. The research also addresses several management information system design considerations used in developing the prototype system. The considerations differentiate data from information and suggest that automated analysis systems should produce information useful for managerial decision making. Included with the research are the computer program and instructions for its implementation and operation. Author (GRA)

N77-20913# Army Construction Engineering Research Lab., Champaign, Ill.
A PRELIMINARY CONCEPT FOR A DESIGN CRITERIA MANAGEMENT SYSTEM
Michael J. OConnor and David A. Jordani Sep. 1976 89 p refs
(AD-A032125; ERL-SR-P-74) Avail: NTIS HC A05/MF A01 CSCL 13/13

The Corps of Engineers' design process relies on the relevancy and currentness of the data used in facility design and the transfer of these data to and from a variety of design and review levels. This report presents a conceptual description of an effective system for the organization, management, and communication of Department of Defense and Corps of Engineers military construction design criteria. The conceptual system comprises three major subsystems: (1) the Standard Design Criteria Subsystem provides for the handling, consistency checking, and production of standard design criteria; (2) the Project-Specific Design Criteria Subsystem permits the introduction of project-specific criteria and the merging of them with standard criteria; and (3) the Facility Criteria File Generation Subsystem translates the criteria into an appropriate format and relates the criteria to the design procedures. Author (GRA)

N77-22994# Michigan Univ., Ann Arbor. Inst. for Social Research.
FUTURE PERFORMANCE TREND INDICATORS: A CURRENT VALUE APPROACH TO HUMAN RESOURCES ACCOUNTING. REPORT 2: INTERNAL CONSISTENCIES AND RELATIONSHIPS TO PERFORMANCE IN ORGANIZATION VI
Patricia A. Percorella and David G. Bowers Oct. 1976 105 p refs
(Contract N00014-76-C-0362)
(AD-A033608) Avail: NTIS HC A06/MF A01 CSCL 05/1

This report describes analyses preparatory to construction of a suitable file for generating a system of future performance trend indicators. Such a system falls into the category of a current value approach to human resources accounting. It requires that there be a substantial body of data which: (1) Uses the work group or unit, not the individual, as the analysis unit, and which contains standard measures of the human oragnization and dollar-convertible performance measures, both with high internal consistency; and (2) Displays a high frequency of statistically significant relationships of human organization to performance measures. The report describes analyses which were conducted on data from 3 plants of a multi-location manufacturing organization. Internal consistency reliabilities of both human organization (survey) data and performance (total variable expenses and absence rate) were shown to be high, and a pattern of human organization-to-performance correlations resulted which are quite useable. With this data, the authors now have a base of 5 organizational data sets from which they should be able to take the next steps: multiple regression, time lag and magnitude estimation, and value attribution. GRA

N77-23994# Army Materiel Development And Readiness Command, Alexandria, Va.
A PROPOSED R AND D MANAGEMENT MODEL
Robert F. Chaillet and Herman W. Mies Dec. 1976 46 p
(AD-A033099) Avail: NTIS HC A03/MF A01 CSCL 05/2

This report describes a proposal that would account for the resources used to perform basic research and exploratory development within the Department of Defense. It describes a means by which research and development managers can determine the output being derived from the resources expended. The proposed system could be implemented with minor changes to existing regulatory reporting requirements. No new DOD reporting forms would be required for the proposed system. Author (GRA)

N77-24000# Harry Diamond Labs., Adelphi, Md.
RECALL: A MANAGEMENT INFORMATION RETRIEVAL SYSTEM FOR THE WANG 2200
Howard M. Bloom Nov. 1976 59 p
(AD-A034427; HDL-TM-76-36) Avail: NTIS
HC A03/MF A01 CSCL 05/2

A data-base language called RECALL has been implemented on the Wang 2200 programmable desk calculator. The language was patterned after RETRIEVE, developed by Tymshare, Inc., for its time-sharing network. Differences between the two implementations are very minor. The report describes each command in the language and gives a comprehensive example to illustrate how the entire system can be used. The listing of the program allows the reader to make modifications, if necessary. The RECALL system is implemented on a 2200C calculator with 16k bytes of memory and a model 2230 disk used for temporary storage

of the overlay segments needed for running the program. The system assumes that the data bases will be permanently saved on tape cassette.
Author (GRA)

N77-28000# Committee on Science and Technology (U. S. House).
PROGRAM PLANNING AND CONTROL WITH NASA AND THE GAO, PART 1
Washington GPO 1976 30 p Hearing before Subcomm. on Space Sci. and Applications of Comm. on Sci. and Technol., 94th Congr., 2d Sess., No. 62, 18 Mar. 1976
(GPO-70-420) Avail: Subcomm. on Space Science and Applications CSCL 05A

A comprehensive review of NASA program planning and control was undertaken. The data base generated by NASA and under review by GAO was examined. The structure and development of the data base and the plans of action to analyze the large volume of data generated are described.
S.M.

N77-28010# Naval Ship Research and Development Center, Bethesda, Md.
NAVY LOGISTICS INFORMATION SHARING (NAVLIS) PROJECT Final Report, Jan. 1973 - Jun. 1976
Jun. 1976 469 p ref
(AD-A035847; DTNSRDC-76-0120) Avail: NTIS HC A02/MF A01 CSCL 09/2

The primary objective of the NAVLIS Project was application of computer networking and data base accessing technology to the current Navy automated logistics environment. The program was terminated in December 1975. This report describes the computer software developed during the construction of a pilot model and the capabilities of that software to extract data from distributed data bases on non-homogeneous computers at geographically dispersed sites. The major technical interests and contributions of the project were Distributed Data Directory concept, Generalized parameter-driven data base interface, Synonym resolution capability and Secondary hit resolution capability. The major recommendations of this report are that NAVLIS Technology be reviewed for its relevance to on-going university level projects, NAVLIS Technology be considered for its potential benefits to other logistics system developments, such as WWMICS and NAICOMMIS, and consideration be given to utilizing the NAVLIS Technology in networking the Navy Data Processing Service Centers.
GRA

N77-28026# Cornell Univ., Ithaca, N.Y. School of Operations Research and Industrial Engineering.
OPTIMAL POLICY FOR DATABASE BATCH OPERATIONS: BACKUP, CHECKPOINTING, AND BATCH UPDATE
John A. Muckstadt and Guy M. Lohman Sep. 1976 24 p refs
(Contract N00014-75-C-1172)
(AD-A037233; TR-312) Avail: NTIS HC A02/MF A01 CSCL 09/2

The purpose of this paper is to present a general model for determining the optimal frequency of batch operations. Specifically, optimal backup, checkpointing, and batch updating policies are derived. Our approach exploits inventory parallels, by seeking the optimal number of items--rather than a time interval--to trigger a batch. The Renewal Reward Theorem is used to find the average long run costs for backup, recovery, and item storage, per unit time, which is then minimized to find the optimal backup policy. This approach allows us to make far less restrictive assumptions about the update arrival process than did previous models, as well as to include storage costs for the updates. The optimal checkpointing and batch updating policies are shown to be special cases of this optimal backup policy. The derivation of previous results as special cases of this model, and an example, demonstrate the generality of the methodology we develop.
Author (GRA)

N77-28972# Committee on Science and Technology (U. S. House).
NASA PROGRAM PLANNING AND CONTROL, PART 2
Washington GPO 1976 21 p Hearing before Subcomm. on Space Sci. and Applications of the Comm. on Sci. and Technol., 94th Congr., 2d Sess., no. 84, 1 Jul. 1976
(GPO-76-106) Avail: Subcomm. on Space Sci. and Applications CSCL 05A

Data bases compiled by NASA for ten field centers are analyzed by GAO representatives and inconsistencies found are discussed. Data base information included: (1) research and development program descriptions and manpower data; (2) facilities data; and (3) a description of management planning and control techniques. Problems with the implementations of NASA's planning guidelines are identified, and recommendations for improvement are made.
A.R.H.

N77-28982# National Bureau of Standards, Washington, D. C. System and Software Div.
THE CODASYL DATA BASE APPROACH: A COBOL EXAMPLE OF DESIGN AND USE OF A PERSONNEL FILE Final Report
Edgar H. Sibley Feb. 1974 81 p
(PB-265694/0; NBSIR-74-500) Avail: NTIS HC A05/MF A01 CSCL 05A

Examples of the use of the proposed CODASYL Data Definition Language and Data Base Language extensions to COBOL are given. The needs and data base elements which can be expected for a set of simple personnel applications are discussed. A few of the processes (programs) which are required by typical personnel departments, and their implementation (in outline) in three COBOL programs are described.
GRA

N77-30013# Rowland and Co., Haddonfield, N. J.
IN SUPPORT OF TECHNICAL DEVELOPMENT PLAN 43-03X, EDUCATION AND TRAINING Final Report, 1 Dec. 1969 - 15 Nov. 1976
Edward Marlowe and George E. Rowland 15 Nov. 1976 54 p refs
(Contract N00014-74-C-0269; NR Proj. 154-353)
(AD-A038346; R/C-76-12-124) Avail: NTIS HC A04/MF A01 CSCL 05/9

This is the final technical report on a five-phase program to develop a Data Management System and a Student Management System. These findings pertain to the naval air training system features that impact on the enhancement of individualized student pilot training treatment and on student training success prediction capabilities and options. The Data Management System (DMS) was designed and implemented on to a Nova 800 minicomputer to demonstrate the feasibility of operation. This DMS is a user-oriented online system which permits non-programmer or non-computer type personnel to create data base files, update these files, search single or multiple files, and to secure hard copy printouts of search results. A unique feature is provided which permits users to execute certain descriptive and analytic statistics on records located by the search. The Student Management System consists of a description and specification of the concept, products and records required to enhance and individualized student naval pilot training treatment program. These student profiles form the quantitative bases from which administrative training personnel can select individualized treatment options.
GRA

N77-31006# Committee on Science and Technology (U. S. House).
NASA-PROGRAM PLANNING AND CONTROL
Washington GPO 1976 210 p Rept. by the Subcomm. on Space Science and Applications of the Comm. on Sci., and

Technol., 94th Congr., 2d Sess., Dec. 1976
(GPO-80-490) Avail: Subcomm. on Space Science and Applications

To provide a basis for better examination of the employment of resources of NASA, a review of program planning and control was undertaken. A data base was designed to examine manpower, dollars, facilities, and nature of programs underway and the planning and control process used to organize and direct resources to accomplish goals and objectives. Author

N78-10847*# National Aeronautics and Space Administration, Washington, D. C.
OFFICE OF UNIVERSITY AFFAIRS MANAGEMENT INFORMATION SYSTEM: USERS GUIDE AND DOCUMENTATION
Judy Distin, Doris Goodwin, and W. A. Greene Sep. 1977 383 p refs
(NASA-TM-78422) Avail: NTIS HC A17/MF A01 CSCL 05A

Data on the NASA-University relationship are reported that encompass research in over 600 schools through several thousand grants and contracts. This user-driven system is capable of producing a variety of cyclical and query-type reports describing the total NASA-University profile. The capabilities, designed as part of the system, require a minimum of user maintenance in order to ensure system efficiency and data validity to meet the recurrent Statutory and Executive Branch information requirements as well as ad hoc inquiries from NASA general management, Congress, other Federal agencies, private sector organizations, universities and individuals. The data base contains information on each university, the individual projects and the financial details, current and historic, on all contracts and grants. Complete details are given on the system from its unique design features to the actual steps required for daily operation. Author

N78-21970*# Ross (S.) and Co., Boston, Mass.
CONTINUED IMPLEMENTATION AND TESTING OF A NEIGHBORHOOD OFFICE CENTER (NOC) AND INTEGRATION OF THE NOC WITH AN ADMINISTRATIVE CORRESPONDENCE MANAGEMENT INFORMATION SYSTEM Final Report
16 Mar. 1978 85 p
(Contract NASw-3057)
(NASA-CR-156150) Avail: NTIS HC A05/MF A01 CSCL 05A

The concept of decentralized (remote) neighborhood offices, linked together through a self-sustaining communications network for exchanging voice messages, video images, and digital data was quantitatively evaluated. Hardware and procedures for the integrated multifunctional system were developed. The configuration of the neighborhood office center (NOC) is explained, its production statistics given, and an experiment for NOC network integration via satellite is described. The hardware selected for the integration NOC/management information system is discussed, and the NASA teleconferencing network is evaluated.
A.R.H.

N78-24244*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
AN EFFECTIVE PROCUREMENT AND FINANCIAL MANAGEMENT REPORTING SYSTEM
J. B. Rozek and F. R. Maiocco *In its* The Deep Space Network 15 Apr. 1978 p 289-310 ref

Avail: NTIS HC A14/MF A01 CSCL 05A

The existing computerized Goldstone procurement and financial (GPF) management data base system is described. Sample management analysis reports are included and discussed, along with estimated cost savings and anticipated benefits of the computerized system. In general, the system structure and procedures are relevant to any company's financial and procurement data acquisition and information handling system. Test data are used to demonstrate the capability of the GPF system of programs. Author

N78-24974*# Barry (Theodore) and Associates, Los Angeles, Calif.
SAMICS SUPPORT STUDY. VOLUME 1: COST ACCOUNT CATALOG Final Report
Sep. 1977 94 p refs Sponsored in part by ERDA Prepared for JPL
(Contracts NAS7-100; JPL-954800)
(NASA-CR-157131; ERDA/JPL-954800-77/2.1) Avail: NTIS HC A04/MF A01 CSCL 05A

The Jet Propulsion Laboratory (JPL) is examining the feasibility of a new industry to produce photovoltaic solar energy collectors similar to those used on spacecraft. To do this, a standardized costing procedure was developed. The Solar Array Manufacturing Industry Costing Standards (SAMICS) support study supplies the following information: (1) SAMICS critique; (2) Standard data base--cost account structure, expense item costs, inflation rates, indirect requirements relationsips, and standard financial parameter values; (3) Facilities capital cost estimating relationships; (4) Conceptual plant designs; (5) Construction lead times; (6) Production start-up times; (7) Manufacturing price estimates.
Author

N78-22881# SDC/Integrated Services, Inc., Research Triangle Park, N. C.
NATIONAL COMPUTER CENTER PERSONNEL MANAGEMENT INFORMATION SYSTEM DESIGN REQUIREMENTS SPECIFICATION. VOLUME 1: DESIGN REQUIREMENTS AND DATA DICTIONARY
17 Mar. 1978 249 p
(Contract EPA-68-02-2832)
(PB-282589/1) Avail: NTIS HC A11/MF A01; also available in set of 3 reports HC E14, PB-282588-SET CSCL 05I

The design requirements for an EPA personnel management information system are discussed as well as an index system which would be independent of a specific computer configuration and adaptable to a data base management system. Topics cover: (1) processing requirements; (2) an inclusive set of reports to be produced by the system; and (3) definition of all the input data elements needed to produce those reports. GRA

N78-22882# SDC/Integrated Services, Inc., Research Triangle Park, N. C. NCC-Support Branch.
NATIONAL COMPUTER CENTER PERSONNEL MANAGEMENT INFORMATION SYSTEM DESIGN REQUIREMENTS SPECIFICATION. VOLUME 2: REPORT INDEX AND FORMATS
17 Mar. 1978 348 p
(Contract EPA-68-02-2832)
(PB-282590/9) Avail: NTIS HC A15/MF A01; also available in set of 3 reports HC E14, PB-282588-SET CSCL 05I

The personnel management information system appendices are structured to conform to the following basic management areas: awards; data base integrity; equal employment opportunity; employment and special programs; experience and education; executive development; job history; labor relations and grievances; management evaluation; national reports; position management and control; production reports; and training. Each appendix contains proposed report descriptions and formats considered pertinent to a particular management area. In many cases, reports were designed to provide data which is relevant to more than one management area. GRA

N79-18817# Naval Research Lab., Washington, D. C. Computer Science Lab.
A STUDY OF MANAGEMENT INFORMATION SYSTEM NEEDS FOR THE ELECTROMAGNETIC COMPATIBILITY LABORATORY OF THE NAVAL AIR TEST CENTER
Gerald A. Wilson May 1978 28 p refs
(AD-A057688; AD-E000184; NRL-MR-3775) Avail: NTIS HC A03/MF A01 CSCL 05/1

The requirements and utility of management information systems to support the EMC/EMI effort are reported. Those aspects of the work performed by the EMC lab of NATC which might benefit from the support of a management information system, were investigated and the most cost effective manner for installing such a system was recommended. It was determined that there are two distinct, though closely related, needs for management information which exist in the EMC laboratory of NATC. The first requirement is a system to manage a data base of aircraft equipment and component specifications. This would be used by the engineers and technicians performing EMC/EMI testing and evaluation of aircraft. The second requirement is a management information system to maintain and generate necessary reports. B.B.

N79-25915*# Computer Sciences Corp., Houston, Tex. Applied Technology Div.
DESIGN SPECIFICATION, INTEGRATED PROCUREMENT MANAGEMENT SYSTEM, VERSION 2 (IPMS-2) ONLINE SUBSYSTEM, VOLUME 1
L. E. Ely Apr. 1979 184 p
(Contract NAS9-15700)
(NASA-CR-160248; JSC-14847) Avail: NTIS HC A09/MF A01 CSCL 05A

The design for the online subsystem is detailed. Input template design and processing logic for all pr, contract, and CCA forms used by the Procurement Operations Office are discussed. A.R.H.

N79-27003# Pennsylvania Univ., Philadelphia. Wharton School of Finance.
MODEL MANAGEMENT SYSTEMS: A FRAMEWORK FOR DEVELOPMENT Technical Report, Jan. - Dec. 1979
Joyce J. Elam 12 Feb. 1979 28 p refs
(Contract N00014-75-C-0440)
(AD-A067246; Rept-79-02-04) Avail: NTIS HC A03/MF A01 CSCL 05/1

This paper presents an architecture for a generalized model management system that facilitates the integration of management science models into a decision support system. The objective of the system is to support the decision-maker both in specifying a problem and in effecting a solution. This is accomplished by providing him/her with a means for interacting with a complex structured database to specify the structure of some problem; and to solve the model defined for the problem using appropriate information -- either from the database or some other source -- and efficient solution procedures. Author (GRA)

N79-28047# Naval Postgraduate School, Monterey, Calif.
FEASIBILITY STUDY OF A COMPUTERIZED MANAGEMENT INFORMATION SYSTEM FOR THE NOAA CORPS PERSONNEL SYSTEM M.S. Thesis
Alan D. Anderson Dec. 1978 153 p refs
(AD-A068578) Avail: NTIS HC A08/MF A01 CSCL 05/1

The National Oceanic and Atmospheric Administration (NOAA) Commissioned Personnel Division was in the situation of being subject to increasing demands for information and services and having a fixed number of office personnel to fulfill those demands. A study was performed to investigate the feasibility of converting some aspects of the manual data handling procedures to computerized handling. Objectives were defined as: reducing data retrieval and information preparation time; increasing currency of data; aiding in monitoring suspense dates; eliminating some hard copy records; and improving information dissemination. A generalized computer system using a data base management system software package was designed. Alternatives for obtaining the requisite capabilities were evaluated and an implementation procedure was outlined. It was concluded that the automation of the system was feasible and would most likely result in increased effectiveness. GRA

N79-31096*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
DATA BASE MANAGEMENT SYSTEMS PANEL WORKSHOP: EXECUTIVE SUMMARY
1 Aug. 1979 18 p Workshop held at Pasadena, Calif., 5-7 Mar. 1979
(Contract NAS7-100)
(NASA-CR-162105; JPL-Pub-79-70) Avail: NTIS HC A02/MF A01 CSCL 05A

Data base management systems (DBMS) for space acquired and associated data are discussed. The full range of DBMS needs is covered including acquiring, managing, storing, archiving, accessing and dissemination of data for an application. Existing bottlenecks in DBMS operations, expected developments in the field of remote sensing, communications, and computer science are discussed, and an overview of existing conditions and expected problems is presented. The requirements for a proposed spatial information system and characteristics of a comprehensive browse facility for earth observations applications are included. A.W.H.

N80-13992*# Information Planning Associates, Inc., Gaithersburg, Md.
THE WORK REQUEST SYSTEM OF A NASA Q1 PACKAGE
15 Nov. 1979 61 p
(Contract NASw-3176)
(NASA-CR-162511) Avail: NTIS HC A04/MF A01 CSCL 05A

A computer package is described which can be used to track any type of work that is controlled on the basis of work requests and purchase orders/contracts. Run on any NASA QI, using floppy disks only, the system can handle about 1,200 requests per year, and provides performance and summary reports for management. The milestones tracked at Goddard are described as well as directions for installing the system. Sample reports and operator instructions are included. A.R.H.

N80-14866*# Information Planning Associates, Inc., Gaithersburg, Md.
FUNCTIONAL DESIGN SPECIFICATION: NASA FORM 1510 Final report
15 Nov. 1979 99 p
(NASA-CR-162513) Avail: NTIS HC A05/MF A01 CSCL 05A

The 1510 worksheet used to calculate approved facility project cost estimates is explained. Topics covered include data base considerations, program structure, relationship of the 1510 form to the 1509 form, and functions which the application must perform: WHATIF, TENENTER, TENTYPE, and data base utilities. A sample NASA form 1510 printout and a 1510 data dictionary are presented in the appendices along with the cost adjustment table, the floppy disk index, and methods for generating the calculated values (TENCALC) and for calculating cost adjustment (CONSTADJ). Storage requirements are given. A.R.H.

N80-14860# Martin Marietta Aerospace, Orlando, Fla.
US ROLAND 2 LOGISTICS MODEL (ROLOG): USER'S GUIDE
T. E. Wilkerson, J. Neale, S. Dunkin, Edwin Schwemmer, and Bradley B. Dunn Oct. 1978 61 p refs
(Contract DAAK40-78-C-0198)
(AD-A074449) Avail: NTIS HC A04/MF A01 CSCL 09/2

The US ROLAND Logistics Model (ROLOG) is a series of computer programs for processing LSAR data, updating the data base, performing logistic support effectiveness calculations, and reporting data in both graphic and tabular formats. This document is intended to assist the user in executing the programs to achieve realism in the outputs specific to the operational and support scenarios being evaluated. GRA

N80-28229# National Technical Information Service, Springfield, Va.
DATA BASE MANAGEMENT. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1979 - Mar. 1980
Brian Carrigan Apr. 1980 103 p Supersedes NTIS/PS-79/0384; NTIS/PS-78/0328
(PB80-808165; NTIS/PS-79/0384; NTIS/PS-78/0328) Avail: NTIS HC $30.00/MF $30.00 CSCL 09B

The advent of on-line systems and the increasing problems of file organization, file maintenance, and file structures of data bases has required the study and development of data base management systems. This bibliography of Federally funded research cites the development of software packages and implementation of data base management systems into various information systems. This updated bibliography contains 96 abstracts, 87 of which are new entries to the previous edition. GRA

N80-28229# National Technical Information Service, Springfield, Va.

DATA BASE MANAGEMENT. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Mar. 1980

Brian Carrigan Apr. 1980 258 p Supersedes NTIS/PS-79/0385; NTIS/PS-78/0329
(PB80-808173; NTIS/PS-79/0385; NTIS/PS-78/0329) Avail: NTIS HC $30.00/MF $30.00 CSCL 09B

The advent of on-line systems and the increasing problems of file organization, file maintenance, and file structures of data bases have resulted in the study and development of data base management systems. This bibliography of worldwide literature cites research on the development of software packages and the implementation of data base management systems into various information systems. This updated bibliography contains 251 abstracts, 66 of which are new entries to the previous edition. GRA

N80-28230# National Technical Information Service, Springfield, Va.

DATA BASE MANAGEMENT. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1976 - 1979

Brian Carrigan Apr. 1980 262 p
(PB80-808157) Avail: NTIS HC $30.00/MF $30.00 CSCL 09B

The advent of on-line systems, and the increasing problems of file organization, file maintenance, and file structures of data bases, has required the study and development of data base management systems. This bibliography of Federally funded research cites the development of software packages and implementation of data base management systems into various information systems. Also cited are guidelines for use in optimizing and modelling data bases. This updated bibliography contains 255 abstracts, none of which are new entries to the previous edition. GRA

N80-31347# General Electric Co., Lynn, Mass. Aircraft Engine Group.

LOGISTICS FORECASTING FOR ACHIEVING LOW LIFE CYCLE COST

G. Walker *In* AGARD The Appl. of Design to Cost and Life Cycle Cost to Aircraft Eng. May 1980 25 p refs

Avail: NTIS HC A08/MF A01

The on condition maintenance concept (OCM) provides the potential for reduced life cycle costs (LCC) by fully utilizing potential parts life and reducing maintenance frequency. With the advent of OCM logistics requirements are heavily influenced by wearout characteristics and usage severity. In such cases more sophisticated forecasting methods are required which realistically represent the dynamics of the logistics system inherent in such a maintenance philosophy. If efficient logistics management is to be attained, such forecasting tools should also provide the capability to perform tradeoff studies on the cost effectiveness of alternative maintenance or logistics systems. The use of modelling methods which are proving practical in forecasting and tradeoff analyses and therefore in establishing an optimum logistics and support environment is explored. Methods discussed include the consideration of wearout characteristics where components exhibit an age related replacement rate, and also replacement of components which may have a specified maximum life in terms of operating cycles or mission severity. The use of engine history recorders and parts tracking systems and their impact on achieving optimum LCC is also discussed. A.R.H.

N80-32271# Air Force Academy, Colo.

A RESEARCH ACTIVITIES MANAGEMENT SYSTEM Final Report, 1 Nov. 1979 - 27 Feb. 1980

John S. Wilkes Feb. 1980 43 p
(AF Proj. 2303)
(AD-A086578; FJSRL-TR-80-0007) Avail: NTIS HC A03/MF A01 CSCL 05/2

A Research Activities Management System is described. It is a computerized storage and retrieval system that allows the manager of a scientific or engineering research organization to receive an organized accounting of the research activities of the organization. The scope of the data base and the nature of the items comprising the data base are defined. Examples of the use of the system are presented, using the research activities of a chemistry basic research laboratory as the data base. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

A76-45980 # **ESA - Electronic component databank.** M. Lombardo (ESA, Space Documentation Service, Frascati, Italy). In: International Scientific-Technological Conference on Space, 16th, Rome, Italy, March 18-20, 1976, Proceedings.
Rome, Rassegna Internazionale Elettronica Nucleare ed Aerospaziale, 1976, p. 109-119.

The ESA Electronic Component Databank (ECDB) originally interested in high reliability components for spacecraft has been extended to include products not applicable to space use. The data system is designed to provide easy access to reliable information on electronic components at a reasonable cost. Various aspects of the system are considered including quality classification, product classification, record patterns, and the on-line system. ESA ECDB access modes are discussed including ESA-RECON, dial-up terminals, VDU terminals, the component reference book, enquiry service by mail, and space component tables. B.J.

A77-18981 **Worldwide indexes to Landsat coverage.** J. W. Schoonmaker, Jr. (U.S. Geological Survey, National Center, Reston, Va.). In: American Society of Photogrammetry, Annual Meeting, 42nd, Washington, D.C., February 22-28, 1976, Proceedings.
Falls Church, Va., American Society of Photogrammetry, 1976, p. 286-295. 8 refs.

The U.S. Geological Survey has produced a set of indexes depicting worldwide Landsat coverage. Seven small-scale, computer-generated maps constituting the World Plotting Series were used as a base and overprinted with selected Landsat coverage information. Index tapes of the imagery acquired during the first 2 years of Landsat were computer sorted and processed to determine the minimum cloud cover available for every nominal scene. Symbols denoting least cloud cover were plotted on film by a computer-controlled flatbed precision plotter; orbit paths and image rows were also plotted automatically. Except for type stick-up of names and explanatory text, the index series was entirely computer-generated. Future editions depicting later coverage or other desired criteria will require little more than new computer sortings of the Landsat coverage tapes. (Author)

A77-27854 * # **A mini/microcomputer-based land use information system.** R. N. Seitz (NASA, Marshall Space Flight Center, Information Management and Analysis Branch, Huntsville, Ala.), R. L. Keefer (Computer Sciences Corp., Huntsville, Ala.), L. J. Britton (U.S. Department of Agriculture, Salt Lake City, Utah), and J. M. Wilson (Tennessee State Planning Office, Nashville, Tenn.). In: American Society of Photogrammetry; Annual Meeting, 43rd, Joint Symposium on Land Data Systems, Washington, D.C., February 27-March 5, 1977, Proceedings. Symposium co-sponsored by the American Congress on Surveying and Mapping. Falls Church, Va., American Society of Photogrammetry, 1977, p. 531-547. (ASP 77-260)

The paper describes the Multipurpose Interactive NASA Information System (MINIS), a data management system for land-use applications. MINIS is written nearly entirely in FORTRAN IV, and has a full range of conditional, Boolean and arithmetic commands, as well as extensive format control and the capability of interactive file creation and updating. It requires a mini or microcomputer with at least 64 K of core or semiconductor memory. MINIS has its own equation-oriented query language for retrieval from different kinds of data bases. It features a graphics output which permits output of overlay maps. Some experience of the U.S. Department of Agriculture and the Tennessee State Planning Office with MINIS is discussed. P.T.H.

A77-33312 * **Retrieval techniques and graphics displays using a computerized stellar data base.** J. Mead (NASA, Goddard Space Flight Center, Greenbelt, Md.) and T. A. Nagy (Computer Sciences Corp.). In: Compilation, critical evaluation and distribution of stellar data; Proceedings of the Thirty-fifth Colloquium, Strasbourg, France, August 19-21, 1976. Dordrecht, D. Reidel Publishing Co., 1977, p. 161-166.

The paper describes a stellar data retrieval system for which the data base consists of 28 machine-readable astronomical catalogs. Eleven of these catalogs have been combined into the Goddard Cross Index (GCI), which serves as the computer entry point to these catalogs. The full data entry from any of the GCI catalogs can be retrieved in a single computer run. With this system, it is possible to prepare candidates for observation by searching the data base for stars with given characteristics. Generation of plots of all catalog stars in or near the telescope's field of view to scale of Palomar, other atlases, or to the telescope itself for use as observing charts or to aid in identifying unknown sources, can be accomplished. P.T.H.

A78-10127 **PASCAL - A multidisciplinary data base, its use in atomic and molecular physics and the physics of fluids and plasmas (PASCAL - Une base de données multidisciplinaire, son utilisaton en physique atomique et moléculaire et physique des fluides et des plasmas).** J. M. Buhr and C. Degen (CNRS, Centre de Documentation, Paris, France). *(CEA, Compagnie Générale d'Electricité, DGRST, DRME, Electricité de France, and Thomson-CSF, Colloque National de Physique des Plasmas, Paris, France, Dec. 6-10, 1976.) Journal de Physique*, vol. 38, Aug. 1977, Supplement, p. C3-249 to C3-251. In French.

We describe the system PASCAL of the Centre de Documentation of C.N.R.S., which deals with a multidisciplinary data base. PASCAL is an automated system for input, treatment and selective dissemination on a wide scope of scientific and technical fields. Its products are tape series, 'Bulletins Signalétiques', documentary profiles, retrospective searching as well in batch as on line. As illustration, we give an example in atomic and molecular physics. (Author)

A78-14886 * # **Remote sensing and geographically based information systems.** R. C. Cicone (Michigan, Environmental Research Institute, Ann Arbor, Mich.). In: International Symposium on Remote Sensing of Environment, 11th, Ann Arbor, Mich., April 25-29, 1977, Proceedings. Volume 2. Ann Arbor, Mich., Environmental Research Institute of Michigan, 1977, p. 1127-1136. 18 refs. Contract No. NAS9-14988.

A structure is proposed for a geographically-oriented computer-based information system applicable to the analysis of remote sensing digital data. The structure, intended to answer a wide variety of user needs, would permit multiple views of the data, provide independent management of data security, quality and integrity, and rely on automatic data filing. Problems in geographically-oriented data systems, including those related to line encoding and cell encoding, are considered. J.M.B.

A78-29486 # **Principles of information management in data processing and control systems (Printsipy informatsionnogo obespecheniia v sistemakh pererabotki informatsii i upravleniia).** N. G. Zaitsev. Kiev, Izdatel'stvo Naukova Dumka, 1978. 184 p. 90 refs. In Russian.

The book sets forth basic principles of organization and utilization of information describing the state of controlled objects. The fundamental concept is that of 'representational' information, that is, information describing the external medium in terms of the categories 'object', 'properties', and 'relations'. Requirements on the language resources of information management are formulated. Attention is given to formalization of data, structure and types of data blocks, ordering of data, data control, forming the data base, data access, comparison, search, and organization of retrieval. P.T.H.

A80-34018 # **Two new energy information bases - ERDI/West, an energy research and development inventory for the West; and ESIDD, energy saving and investment data and documents.** A. H. Rosenfeld and F. C. Winkelmann (California, University, Berkeley, Calif.). *CODATA Bulletin*, no. 23, May 1977, p. 1-3; Discussion, p. 3, 4. ERDA-supported research.

Two new energy information bases, ERDI/West and ESIDD are described. ERDI/West is a computer-based inventory destined to cover all energy-related activity in the Western Region of the U.S. It now contains information on projects and investigators in California, but ultimately will also have document and data files. ERDI/West is expected to be a useful tool for administrators, legislators, and researchers in planning, funding, or conducting energy research and development in the West. The second data base, ESIDD, Energy Savings and Investment Data and Documents, contains up-to-date information on existing documents and data on annual energy savings and required investment for different energy conservation measures in homes, commercial buildings, industry, and in home appliance selection. To illustrate the importance of cost-to-saving data for setting energy priorities, two energy strategies are compared: producing more energy by building a $1.6 billion synthetic gas plant, versus conserving energy by adding extra insulation to existing homes and appliances. (Author)

A80-34020 **CODATA Directory of Data Sources for Science and Technology. I - Crystallography.** *CODATA Bulletin*, no. 24, June 1977. 48 p. 138 refs.

This chapter is primarily concerned with structural, property and physical data derived from or used in crystallographic studies. The format adopted includes the following sections: Section A - international data projects; Section B - national data projects; Section C - data centers; Section D - major publication series; Section E - other data sources; and Section F - bibliography. Indexes are included by subject and by country in order to facilitate information retrieval. S.D.

A80-34022 **CODATA Directory of Data Sources for Science and Technology. II - Hydrology.** *CODATA Bulletin*, no. 35, Dec. 1979. 92 p.

This chapter deals quantitatively and qualitatively with data available throughout the world in the field of hydrology, for surface and underground waters. The format adopted for this chapter, as in all chapters of the CODATA Directory, includes the following sections: Section A - international data projects; Section B - national data projects; Section C - data centers; Section D - major publication series; Section E - other data sources; and Section F - bibliography. Twelve items are retained in each entry in Section C to specify the kind of data involved, as mentioned by a numerical code. S.D.

N78-19077# Machinability Data Center, Cincinnati, Ohio.
[RESEARCH PROGRESS IN DATA PRODUCTION DISTRIBUTION AND COMPUTER PROGRAMS FOR MACHINABILITY DATA CENTER] Annual Report, 1 Aug. 1973 - 31 Jul. 1974
John F. Kahles and John L. Krebs Sep. 1974 26 p
(Contract DSA900-74-C-0512)
(AD-A001601; AMMRC-CTR-74-80; AR-10) Avail: NTIS CSCL 05/2

The distribution of data products continued at a high level during the period of this report. During this period, a total of 150 technical inquiries were processed by the Machinability Data Center (MDC). These inquiries were submitted by 133 different individuals representing 110 branches of government and industry. Notable progress was made in the development of computer programs for generating machining data through the use of numerical analysis techniques. Refinement of these procedures and techniques will enable MDC to predict practicable machining conditions based upon tool life of the cutting tool and other restraints such as force and surface integrity and eventually to build a computer-based national numerical machinability data bank. GRA

N75-21973* Kanner (Leo) Associates, Redwood City, Calif.
UP-TO-DATE STATE OF STORAGE TECHNIQUES USED FOR LARGE NUMERICAL DATA FILES
Vaclav Chlouba *In its* Conf. of the Inform. Process. Sect. of Interkosmos (NASA-TT-F16184) Apr. 1975 p 157-174 refs
Transl. into ENGLISH from the book "Soveshchaniye Sektsii Obrabotka Informatsii (Sbornik Dokladov) Interkosmos" Acad. of Sci., Ger. Democratic Rep., 1974 p 233-253

CSCL 05B
Methods for data storage and output in data banks and memory files are discussed along with a survey of equipment available for this. Topics discussed include magnetic tapes, magnetic disks, Terabit magnetic tape memory, Unicon 690 laser memory, IBM 1360 photostore, microfilm recording equipment, holographic recording, film readers, optical character readers, digital data storage techniques, and photographic recording. The individual types of equipment are summarized in tables giving the basic technical parameters. Author

N75-23376 Computer Aided Design Centre, Cambridge (England).
DATA BANKS AND NETWORKS FOR ENGINEERING DESIGN PURPOSES
G. C. Freeman *In* AGARD Natl. and Intern. Networks of Libraries, Doc. and Inform. Centres Mar. 1975 6 p refs

Special problems of CAD are discussed and data indicate that because of the hierarchical nature of integrated design systems the local data base will also be hierarchical in structure. Communications with other systems via a computer network make it desirable that application programs and data bases should not be inextricably linked. Such a policy would ensure maximum flexibility, making possible economies of scale through the sharing of expertise and software that could then take place. Author

N75-24539# Mitre Corp., McLean, Va.
NATIONAL ENERGY FLOW ACCOUNTS
J. Just, B. Borko, and J. Morris Sep. 1974 206 p refs
(Contract NSF GI-14024)
(PB-239275/1; MTR-6753; NSF/RA/N-74-189) Avail: NTIS HC $7.25 CSCL 05B
A comprehensive, integrated framework for structuring energy data of many types was developed. This set of National energy accounts is designed to be integrated with the National economic accounts and other major data bases. This report outlines the overall concept of four major interlocking accounts dealing with energy flow, energy technology, energy resources and other data. The energy flow account consists of seven subaccounts on energy sources, energy uses, interindustry energy flows, energy prices, energy transportation, energy distribution, and energy supply and demand time profiles. The structure of these accounts is fixed but the level of detail is flexible so that data could be utilized in different degrees of aggregation. GRA

N75-26923# Naval Postgraduate School, Monterey, Calif.
INFORMATION REQUIREMENTS OF A MANAGEMENT INFORMATION SYSTEM RELATING TO THE BUDGETARY DECISIONS OF A COAST GUARD PROGRAM MANAGER M.S. Thesis
James Dale Burk and John Kennedy Miner Dec. 1974 100 p refs
(AD-A003858) Avail: NTIS CSCL 05/1
Information is the lifeblood of any organization. In an era where governmental budgeting is becoming more complex and more significant, operations without the aid of an effective management information system is difficult at best. Prior to the implementation of any management information system, a sound all-encompassing data base is essential. This thesis proposes information requirements to such a data base to be utilized by Coast Guard district level program managers when making budgetary decisions. GRA

N75-27968# Center for Naval Analyses, Arlington, Va. Inst. for Naval Studies.
USERS GUIDE TO THE REPORT GENERATOR FOR THE NAVY RESOURCE MODEL
Joseph David Kinkade and Robert H. Simmons Aug. 1974 34 p refs
(Contract N00014-68-A-0091)
(AD-A004191; CRC-256) Avail: NTIS
This Report Generator is a highly generalized information-extracting and report-formatting computer routine. Through a sophisticated command language and system of dictionaries, it can report out information in countless formats and degrees of detail. The description of the Report Generator in this users guide is for the dictionaries and data files used in the Navy Resource Model (NARM) at CNA. However, it is possible for the reader to apply the Report Generator to his own management information system by creating his own dictionaries for his own data tapes. How to create dictionaries is described in this guide. GRA

N75-28950 Texas A&M Univ., College Station.
A GENERAL MODEL FOR STORAGE AND RETRIEVAL OF CHEMICAL STRUCTURES Ph.D. Thesis
Jose Villarreal, Jr. 1974 230 p
Avail: Univ. Microfilms Order No. 75-15079
A generalized model for storage and retrieval was designed, developed, and implemented. It was adapted to a crystallographic chemical data base. The thesis is that it is possible to design general systems in a modular fashion such that particular modules can be tailored to meet peculiar input/output requirements in certain applications. The system developed as a result of this project can be classified as general since it possesses a certain degree of hardware-independence, data-independence, and applications-independence. The system might also be characterized as pseudo-general since certain modules, input/output related, that make up the system have to be tailored to fit a particular application's requirements. The major portion of the system remains independent of the input data and output requirements. The system permits four methods of retrieval which include facilities for accession number, browsing, and keyword retrievals. It also has a screen searching retrieval capability. Dissert. Abstr.

N75-28963# Michigan Univ., Ann Arbor. Dept. of Industrial and Operations Engineering.
EVALUATION AND OPTIMIZATION OF FILE ORGANIZATIONS THROUGH ANALYTIC MODELING Ph.D. Thesis
Shi Bing Yao 1974 222 p refs
(Contract AF-AFOSR-2219-72; AF Proj. 9769)
(AD-A005721; AFOSR-75-0275TR) Avail: NTIS CSCL 05/2
The research concerns the selection of appropriate file structures and access methods for the construction of large data bases within information systems. A file design system is developed here that can be used by a file designer to select good file organizations from a large number of alternatives. This design system takes its design requirement parameters from the data collection, user activities, and machine characteristics. The output of the design system is a suggested file structure, and the details of the actual file structure can be determined by simulation or other techniques. GRA

N75-28948# Army Troop Support Command, St. Louis, Mo.
DESIGNING A MANUAL COST DATA BASE Final Report
Hal W. Stephenson 28 Feb. 1975 29 p refs
(AD-A006508; TROSCOM-TR-75-1) Avail: NTIS CSCL 05/2
A six-step method for designing a manual cost data base is presented in this report. Indexes and sections of use in a cost data base are defined. An example is given. Prototype forms for eight indexes, an accession logbook and an abstract logbook

are illustrated. The description is sufficiently detailed so a military organization with significant cost research activities could adapt the system to its own needs. GRA

N75-30833# Royal Aircraft Establishment, Farnborough (England).

CONDITIONS AND RESTRICTIONS ON THE FORMULATION OF A HUMAN BIOMETRIC DATA BANK

May 1975 12 p Transl. into ENGLISH from Anthropologie Appl. (Paris), Document AA-69/74, 1974

(RAE-Lib-Trans-1833; BR48101; AA-69/74) Avail: NTIS HC $3.25

The formation and use of a proposed bank of human biometric data is discussed along with the manner in which data of various types would be presented. Computer programs for the data bank are also included. M.J.S.

N75-30836# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

FLEXIBILITY IN INFORMATION RETRIEVAL FOR THE BASE LEVEL MANAGER M.S. Thesis

Joseph A. Coleman and Harris Keller Jan. 1975 114 p refs

(AD-A006337; SLSR-9-75A) Avail: NTIS CSCL 05/2

Standard (preprogrammed) automated data systems are inflexible in satisfying all of the information needs of base level managers. This inflexibility could be alleviated by the use of information retrieval systems, which are designed to extract specific information from a data base, and output that information in the format specified by the user. There are four retrieval systems currently in use at base level within the Air Force. The diversity in the characteristics of these four systems causes confusion on the part of base level managers. This thesis developed eight characteristics which should be included in each base level retrieval system. These eight characteristics were then compared to each of the four base level retrieval systems to determine the extent that each of the retrieval systems possessed the proposed characteristics. The extent that each of the four retrieval systems possessed the eight characteristics was viewed as the degree of flexibility in information retrieval afforded by a particular retrieval system. GRA

N75-30838# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

UNDERSTANDING DATA STRUCTURES Ph.D. Thesis

Rob Gerritsen Feb. 1975 232 p refs

(ARPA Order 2466)

(AD-A008937; AFOSR-75-0545TR) Avail: NTIS CSCL 09/2

Data management programmers are finding their jobs are getting tougher because of the gradual replacement of sequential data bases by network data bases. In addition, there is a new job called Data Administrator for handling the data structure problems associated with network data bases. The goal of this thesis is reduction of these data management tasks by developing and applying a practical theory of data structure. To insure the practical flavor of this research, the Data Base Task Group (DBTG) report has been selected as the specification of the data management system in which the applications function. GRA

N75-30846# Minnesota Univ., Minneapolis. Dept. of Management Sciences.

DESIGN CONSIDERATIONS FOR A COMPREHENSIVE REGIONAL ENERGY INFORMATION SYSTEM

J. D. Naumann, P. C. Knobloch, and N. L. Chervany Jul. 1974 35 p Sponsored by Minnesota Energy Agency, St. Paul

(PB-241123/9; MEA/REIS/WP-7401) Avail: NTIS HC $3.75 CSCL 05B

The regional energy information systems (REIS) concerns itself with decision making on substate, state, and regional levels in emergencies, for tactical decisions, and long-range strategic policies by both government and industry. Effective access to energy information is critical, and REIS is designed to provide a standardized data base with design goals, constraints, parameters, and schedules. The REIS system is being developed; many states, the FEA, and other agencies are developing energy information systems. Shareability of data must be sought, and both technical and procedural requirements for this are discussed, and a plan for action is presented. GRA

N75-31939# Forsvarets Teletekniska Lab., Stockholm (Sweden).

SEMINAR ON RELIABILITY DATA BANKS

A. Ullman, comp. (Swedish Assoc. of Maintenance Engr., UTEK) Nov. 1973 381 p Proc. held at Stockholm, 15-17 Oct. 1973

(FTL-A-A16:41) Avail: NTIS HC $10.25

The need and feasibility of reliability data banks were discussed in 19 papers; the operation of data banks was exemplified, including the collection, pooling, and use of data that may be used by mathematical models. An important feature was to study the extent to which data banks could be used for equipment including types of components other than electronic, such as purely mechanical components. It was suggested that a working group should be appointed with the objective of collecting the required information. Y.J.A.

N75-32947 Ohio State Univ., Columbus.

A MODEL FOR DATA SECURE SYSTEMS Ph.D. Thesis

Edwin John McCauley, III 1975 255 p

Avail: Univ. Microfilms Order No. 75-19469

A multi-level modeling technique is developed to examine protection and access control in data base management systems. This approach allows the treatment of specific issues at a level of abstraction appropriate to that issue. The technique is comprised of: (1) the conceptual model which describes the terms and concepts of protection; (2) the structural model which emphasizes relations between records and uses these relations to provide and enhance security; (3) the engineering model which relates the theoretical results of the higher levels to the practical realities of typical data base management systems. In the lowest level the correctness and completeness of a small demonstration system are discussed. The correctness techniques are viewed as a sketch of a formal algorithm proof. Dissert. Abstr.

N75-33912# Mead Technology Labs., Dayton, Ohio.

AVIONICS CENTRAL DATA BASE MANAGEMENT SYSTEM Final Technical Report, 12 Feb. 1972 - 30 Jun. 1974

Paul H. Beck May 1975 16 p refs

(Contract F33615-72-C-1969; AF Proj. 2004)

(AD-A010419; AFAL-TR-75-88) Avail: NTIS CSCL 05/2

The major objectives of the planned program of work on this contract are the continuous operation, maintenance, modernization, and development of a high-speed, random access, computer controlled, Avionics Technical Information Handling System for Air Force engineers, managers, and staff planners. The elements of the services provided under the contract are a free turnkey operated computer system, terminals, and data communication, and data base administration personnel. GRA

N75-33914# Physics International Co., San Leandro, Calif.

FEASIBILITY OF ARCHIVING, AT AGBABIAN ASSOCIATES, THE GROUND MOTION DATA RESIDING AT PHYSICS INTERNATIONAL COMPANY Final Report, 11 Feb. - 31 Dec. 1974

T. Stubbs May 1975 20 p refs

(Contract DNA001-74-C-0206; DNA Proj. NWED-QAXS)

(AD-A010153; PIFR-684; DNA-3631F) Avail: NTIS CSCL 17/10

A system was developed to introduce digital information into the archives maintained by Agbabian Associates. Cataloging and retrieval of data was tested using the ground motion records obtained from the MINE THROW I event. Both functions were found to be satisfactory. Data on file, which are amendable to archiving, are enumerated. Author (GRA)

N75-33920# Naval Research Lab., Washington, D.C.

PRINCIPLES OF THE CODASYL APPROACH TO THE DESCRIPTION OF DATA STRUCTURES Interim Report

Frank A. Manola Jun. 1975 30 p refs

(AD-A011034; NRL-MR-3068) Avail: NTIS CSCL 05/2

Interest in the subject of data bases and data base management systems has been growing in the past several years at a rapidly accelerating rate both on the part of computer scientists and on the part of managers and data processing personnel in user organizations. Much of this interest has been stimulated by the existence of the language specifications published in the April 1971 report of the CODASYL (Conference On Data Systems Languages) Data Base Task Group (DBTG). These specifications included two data description languages and one data manipulation language, as well as a proposed data base system architecture in which these languages would be used. The specifications were written with a certain background and a specific method of specifying data and data relationships in mind. It is the purpose of this paper to outline some of this background and some of the principles on which these language specifications were based. In particular, the paper concentrates on the underlying philosophy of describing data and its structure embodied in what has come to be known as the network model of data. GRA

N76-10915*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MEDICAL INFORMATION MANAGEMENT SYSTEM (MIMS): A GENERALIZED INTERACTIVE INFORMATION SYSTEM
Sidney Alterescu, Carl A. Friedman, and Kathleen R. Hipkins
Mar. 1975 113 p
(NASA-TM-X-70886; X-207-75-63) Avail: NTIS HC $5.25 CSCL 05B

An interactive information system is described. It is a general purpose, free format system which offers immediate assistance where manipulation of large data bases is required. The medical area is a prime area of application. Examples of the system's operation, commentary on the examples, and a complete listing of the system program are included. Author

N76-10917# Calspan Corp., Buffalo, N.Y.
REENTRY DATA FACILITY USERS GUIDE
May 1975 28 p
(Contract DAHC60-73-C-0033)
(AD-A011405) Avail: NTIS CSCL 05/2

The RDF (Reentry Data Facility) has been established to service the large collection of field data and associated documentation covering some 15 years of down-range radar data gathering and processing. The objectives of the Reentry Data Facility are to preserve and organize MSR (Missile Site Radar), TTR (Target Track Radar), and DR (Discrimination Radar) mission data and mission-related documentation that are of value for the support of reentry physics investigations; provide qualified users with access to the data/documents; and service user requests for data/documents. To this end, the RDF has systematically filed the data and associated documents from all three radars, maintains the capability to reprocess and format data in accordance with user requests, provides for the reproduction and delivery of data, and will periodically inform the reentry community of all available RDF capabilities and services. GRA

N76-11913# Naval Ship Research and Development Center, Bethesda, Md. Computation and Mathematics Dept.
PRELIMINARY DESIGN SPECIFICATION FOR THE NAVLIS PILOT NETWORK PROJECT
B. A. Wallis, I. L. Avrunin, H. W. Mangan (Rockwell Intern. Corp., El Segundo, Calif.), and J. R. Carlyle (Rockwell Intern. Corp., El Segundo, Calif.) 1 Apr. 1974 53 p
(AD-A011823; CMD-22-74) Avail: NTIS CSCL 15/5

The NAVLIS Pilot Network Project will consist of the development and implementation of a distributed data base management system operating on the computers and with the data files at Fleet Data Processing Service Center Pacific (DPSCPAC), Fleet Data Processing Service Center Atlantic (DPSCLANT) and the Naval Material Command Support Activity, (NMCSA), Washington, D.C. DPSCPAC will be the master node or executive site of this three node network. Users will interrogate the network from a remote terminal at any location. The master site executive software will control query processing, and determine location of file or files to be queried. Messages will be sent from the master site via telecommunications to the satellite computer. Satellite software will interpret the message, locate appropriate files, retrieve requested information and send results to the master site. Results will be formatted and output to the user at the terminal. The pilot network will serve as a vehicle for testing the technical feasibility of the NAVLIS baseline concept, for testing user reaction and requirements, and for estimating system implementation costs. GRA

N76-12875*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CATALOG OF IONOSPHERIC AND ATMOSPHERIC DATA
John N. Liles Nov. 1975 124 p refs
(NASA-TM-X-72583; NSSDC-75-07) Avail: NTIS HC $5.50 CSCL 05B

Available data from planetary atmospheres and ionospheric physics (aeronomy) are announced. Most of the data sets identified result from individual experiments carried on board various spacecraft. A spacecraft Automated Internal Management File and a Nonsatellite Data File are utilized to maintain information on these data. Photoreduced reports produced by these information files are presented. A variety of user oriented indexes are included. Author

N76-12876*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STATUS OF AVAILABILITY OF MARINER 10 (1973-085A) TV PICTURE DATA Data Announcement Bulletin
Oct. 1975 31 p
(NASA-TM-X-72584; NSSDC-75-18) Avail: NTIS HC $4.00 CSCL 05B

The Mariner 10 TV data now available from the National Space Science Data Center (NSSDC) are described, and the procedures for ordering these data are explained. Descriptions of the TV data products and supporting documentation scheduled to become available through NSSDC in the future are also included. Author

N76-13953*# Computer Sciences Corp., Falls Church, Va.
MIRADS-2 IMPLEMENTATION MANUAL
Huntsville, Ala. NASA Jun. 1975 155 p refs
(Contract NAS8-21805)
(NASA-CR-144094; MA-006-002-2H) Avail: NTIS HC $6.75 CSCL 05B

The Marshall Information Retrieval and Display System (MIRADS) which is a data base management system designed to provide the user with a set of generalized file capabilities is presented. The system provides a wide variety of ways to process the contents of the data base and includes capabilities to search, sort, compute, update, and display the data. The process of creating, defining, and loading a data base is generally called the loading process. The steps in the loading process which includes (1) structuring, (2) creating, (3) defining, (4) and implementing the data base for use by MIRADS are defined. The execution of several computer programs is required to successfully complete all steps of the loading process. This library must be established as a cataloged mass storage file as the first step in MIRADS implementation. The procedure for establishing the MIRADS Library is given. The system is currently operational for the UNIVAC 1108 computer system utilizing the Executive Operating System. All procedures relate to the use of MIRADS on the U-1108 computer. Author

N76-13961# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
IDEAS ABOUT MANAGEMENT OF LISP DATA BASES
May 1975 39 p refs
(Contract N00014-75-C-0643)
(AD-A013312; AI-M-332) Avail: NTIS CSCL 09/2

The need for systems which support maintenance of LISP-type data bases is discussed, and an experimental system of this kind, called DABA, is described. In this system, a description of the data bases structure is kept in the data base itself, and a number of utility programs use the description for operations on the data base. The description must minimally include syntactic information reminiscent of data structure declarations in more conventional programming languages, and can be extended by the user. Two reasons for such systems are seen: as A.I. programs develop from toy domains using toy data bases, to more realistic exercise, the management of the knowledge base becomes nontrivial and requires program support; a powerful way to organize LISP programs is to make them data-driven, whereby pieces of program are distributed throughout a data base. A data base management system facilitates the use of this programming style. Author (GRA)

N76-13963# Naval Research Lab., Washington, D.C.
DATA SECURITY IMPLICATIONS OF AN EXTENDED SUBSCHEMA CONCEPT
Frank A. Manola and Stanley H. Wilson 15 Jul. 1975 19 p refs
(NRL Proj. B02-24; RF21222401)
(AD-A013248; NRL-7905) Avail: NTIS CSCL 09/2

Modern data base system architectures, such as those based on the CODASYL Data Base Task Group (DBTG) specifications, stress the idea that users of the system should interact with a logical description of that portion of the data base with which they are concerned, called a subschema, which is derived from a logical description of the data base as a whole, called a schema. One of the benefits of this architecture is its ability to provide enhanced data security, since the mapping from schema to subschema may conceal information from the user. Use of this architecture to enhance data security was studied with respect to schema, subschema, and design and implementation of application programs. Instances of such use include both that in the existing DBTG specifications and some proposed extensions to that architecture. GRA

N76-13966# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
THE ENFORCEMENT OF SECURITY POLICIES FOR COMPUTATION Interim Report
Anita K. Jones and Richard J. Lipton May 1975 41 p refs
Prepared in cooperation with Yale Univ.
(Contracts F44620-73-C-0074; DAHC04-72-A-0001; NSF DCR-75-07251; NSF DCR-74-24193)
(AD-A013114; AFOSR-75-1088TR) Avail: NTIS CSCL 15/3

Security policies define how information within a computer system is to be used. Protection mechanisms are built into these systems to enforce security policies. However, in most systems it is quite unclear what policies a particular mechanism can or does enforce. This paper precisely defines security policies and protection mechanisms in order to bridge the gap between them with the concept of soundness: whether a protection mechanism enforces a specific policy for a given program. Different sound protection mechanisms for the same policy and program can then be compared (on the basis of completeness) to determine if one outperforms the others. That a union of mechanisms for the same policy and program can be taken to produce a more complete mechanism is demonstrated. Although a maximal mechanism exists it cannot necessarily be effectively found. In addition to developing a theoretical framework in which to discuss security, a surveillance protection mechanism is introduced which indicates that it is sound and that it is more complete than the commonly used high water mark mechanism. Author (GRA)

N76-14908# Naval Postgraduate School, Monterey, Calif.
FEASIBILITY STUDY FOR ESTABLISHING AN AUTOMATED DATA BASE SYSTEM FOR NAVAL ELECTRONICS ENGINEERING CENTER, VALLEJO M.S. Thesis
James Edward Tarver Jun. 1975 67 p refs
(AD-A013623) Avail: NTIS CSCL 05/9

The purpose of the feasibility study is to establish an automated data base system for Naval Electronics Engineering Center, Vallejo, California. The three divisions, namely, the financial, procurement and program manager's divisions, were analyzed as a separate entity by taking their present methods of operation and determining which methods lend themselves to automation and propose a conceptual EDP system to handle the new data structure.. After combining the applications of each division, a file design structure along with the associated hardware equipment and recommendations for further evaluating the overall performance of the system were supplied for NAVELEX. GRA

N76-15909*# Computer Sciences Corp., El Segundo, Calif. Industrial Management Systems Dept.
AN INTRODUCTION TO THE MARSHALL INFORMATION RETRIEVAL AND DISPLAY SYSTEM
Sep. 1974 41 p
(Contract NAS8-21805)
(NASA-CR-144108; MA-006-001-2H) Avail: NTIS HC $4.00 CSCL 05B

An on-line terminal oriented data storage and retrieval system is presented which allows a user to extract and process information from stored data bases. The use of on-line terminals for extracting and displaying data from the data bases provides a fast and responsive method for obtaining needed information. The system consists of general purpose computer programs that provide the overall capabilities of the total system. The system can process any number of data files via a Dictionary (one for each file) which describes the data format to the system. New files may be added to the system at any time, and reprogramming is not required. Illustrations of the system are shown, and sample inquiries and responses are given. Author

N76-18989# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN INVESTIGATION OF THE REQUIREMENTS FOR BASE ENGINEERING AUTOMATED MANAGEMENT SYSTEM (BEAMS) PRODUCTS CURRENTLY GENERATED AND THEIR EFFECTIVENESS M.S. Thesis
Craig A. Birch and James N. Roberts Aug. 1975 172 p refs
(AD-A015967; SLSR-47-75B) Avail: NTIS CSCL 05/2

In 1968, Air Force Civil Engineering introduced the Base Engineer Automated Management System (BEAMS). This computerized system, designed to fulfill civil engineering managers' informational needs, now generates over 100 products. The purpose of this research was to determine which BEAMS products, if any, were not meeting the informational needs of these civil engineering managers. In particular, 26 BEAMS products which are specified for distribution to the Base Civil Engineer, the Chief of Programs, the Chief of Operations and Maintenance Branch, or the Industrial Engineer examined. Questionnaires were developed to obtain the opinions of these four managers. A random sample of these managers stationed within the contiguous United States was selected to participate in the survey. Civil engineering managers were generally satisfied with the 26 BEAMS products which were investigated. Four products were perceived as not useful by one category of civil engineering managers, Chiefs of Programs. Six products were perceived by either BCEs or Chiefs of Programs as not effective in at least one area. GRA

N76-20013# Defense Logistics Studies Information Exchange, Fort Lee, Va.
DLSIE: DESCRIPTOR LIST
Oct. 1975 84 p
(AD-A017401) Avail: NTIS CSCL 05/2

The publication has been developed as part of the Defense Logistics Studies Information Exchange (DLSIE) continuing effort to provide its users with products that will assist in identifying logistics research relevant to their needs. The DLSIE Descriptor List provides an alphabetical listing of descriptor terms that are used by DLSIE analysts in describing planned, in-process, and completed logistics research efforts which are added to the DLSIE data base. After each entry a parenthetical number is shown. The number represents the total number of citations in the data base for each descriptor as of 31 July 1975. Definitions are provided for acronyms or words that one may not be familiar with. GRA

N76-22111# Electric Power Research Inst., Palo Alto, Calif.
A PROPOSED EPRI EXECUTIVE SYSTEM AND DATA BASE
Lance J. Agee Nov. 1975 50 p refs
(PB-247220/7; EPRI-SR-23) Avail: NTIS HC $4.00 CSCL 18E

This report summarizes the long range objectives of the Electric Power Research Institute (EPRI) Nuclear Power Division

in the area of developing a viable data base and interacting computer programs. The data base considered will contain both experimental and analytical data. The computer programs considered may be simple programs to reduce data or sophisticated computational systems for solving problems such as LOCA or reactor physics calculations of an LWR. In addressing these problems, both the type of computers available and existing executive systems were studied. Of equal importance were the type and physical locations of the potential users, EPRI, the electric utilities, and the general nuclear community at large.
GRA

N76-24082# California Univ., Livermore. Lawrence Livermore Lab.
DATA BASE DESIGN FOR DIGITAL DESIGN AUTOMATION
M. N. Matelan and R. J. Smith, II 12 May 1975 16 p refs
Presented at the ACM Assoc. of Computing Machinery, Minneapolis, 20 Oct. 1975 Sponsored by ERDA
(UCRL-76838; Conf-751014-2) Avail: NTIS HC $4.00

Data organization is perhaps the most important aspect of any design automation system. A data base designed and presently in use at the Lawrence Livermore Laboratory is described. Utilization of the data base by application subsystems is also described. The routines used to access, update, and manipulate the data base are known as the DB manager; particular attention is directed to the DB Kernel, the DB Access Utilities, the DB Manipulation Utilities, and the DB Buffers. ERA

N76-24083# California Univ., Livermore. Lawrence Livermore Lab.
DATA BASE DESIGN FOR DIGITAL DESIGN AUTOMATION
M. N. Matelan and R. J. Smith, II 24 Jul. 1975 10 p refs
Presented at the Workshop on Data-Bases for Interactive Design, Waterloo, Ontario, 15-16 Sep. 1975 Sponsored by ERDA
(UCRL-76838-Rev-1; Conf-750936-1) Avail: NTIS HC $4.00

For abstract, see N76-24082

N76-24084# Atlantic Analysis Corp., Norfolk, Va.
TAC D AND E PROGRAM INFORMATION BASE Final Report, 1 Mar. - 30 Sep. 1975
Richard C. Hanford 30 Nov. 1975 26 p
(Contract N00014-75-C-0745)
(AD-A018708; AAC-105-75-1) Avail: NTIS CSCL 05/2

Requirements for documentation of tactical information within the TAC D and E Program are not being met today and the situation is not likely to improve without special efforts on the part of all participants. A common evaluation framework for TAC D and E efforts and information is fundamental to the success of such efforts. A feasible framework to this end is proposed. If implemented to support project efforts, it appears that a separate effort to provide a relevant corporate memory is not required.
GRA

N76-30111# Naval Sea Systems Command, Washington, D.C.
NAVSEA OCEAN ENVIRONMENTAL ACOUSTIC DATA BANK (NAVDAB) IN SUPPORT OF MOBILE SONAR TECHNOLOGY DEVELOPMENT. VOLUME 1: USER'S GUIDE TO RETRIEVAL Final Report
1 Nov. 1975 137 p refs
(SF52552601)
(AD-A020672; NAVSEA-06H1/036-EVA/MOST-2-V-1) Avail: NTIS CSCL 17/1

The Naval Sea Systems Command Ocean Environmental Acoustic Data Bank (NAVDAB) was established to provide a data base of underwater acoustic and associated environmental data. This document provides detailed information on retrieval procedures with brief introductory material on the background, objectives, organization, scope, and modus operandi of NAVDAB. GRA

N76-31064# City of Reading, Pa.
USER MANUAL FOR GEOGRAPHIC BASE MAINTENANCE
May 1975 94 p ref
(Contract HUD-H-1212)
(PB-251310/5; USAC-RPAS-7035) Avail: NTIS HC $5.00 CSCL 13B

This report is from a series produced by the city of Reading covering activities from systems analysis through implementation and evaluation of urban information systems. This document signals completion of the orientation and training (O and T) effort for the Geographic Base Maintenance Module. This document is intended to provide explicit instructions for input, correction and report procedures of the Standard Permit Processing Module, as well as an overview of its scope within the Reading Integrated Municipal Information System. GRA

N76-33079# California Univ., Berkeley. Lawrence Berkeley Lab.
STANDARDS FOR MULTILATERAL AND WORLD-WIDE EXCHANGE OF GEOTHERMAL DATA, APPENDIX 1
J. J. Herr, S. L. Phillips, S. R. Schwartz, and T. G. Trippe 1975 13 p refs Sponsored by ERDA
(UCID-3792) Avail: NTIS HC $3.50

Standards for the exchange of machine-readable data are discussed at five levels covering: (1) physical characteristics of the medium used in the exchange, (2) overall structure of the data file, (3) format of individual records, (4) types of information contained in a record, and (5) authority files for information definition. The standards are used by the National Geothermal Information Resource for compilations of geothermal energy data. Author (ERA)

N77-10836# European Space Agency, Paris (France).
DATABASE SYSTEMS. INVESTIGATION REPORTS. VOLUME 2: ADABAS, PART 1
Apr. 1976 284 p Transl. into ENGLISH of "Datenbanksysteme. Erfahrungsber. Heft 2: ADABAS, Teil 1", Ges. fuer Mat. u. Datenverarbeitung, Bonn Report, Apr. 1975
(ESA-TT-280-Vol-2-Pt-1) Avail: NTIS HC A12/MF A01

The ADABAS adaptable data base management system is described in detail. The description covers features and properties, system environment, and expenditure. ESA

N77-10837# European Space Agency, Paris (France).
DATABASE SYSTEMS. INVESTIGATION REPORTS. VOLUME 2: ADABAS, PART 2
Apr. 1976 129 p Transl. into ENGLISH of "Datenbanksysteme. Erfahrungsber. Heft 2: ADABAS, Teil 2", Ges. fuer Mat. u. Datenverarbeitung, Bonn Report, Apr. 1975
(ESA-TT-281-Vol-2-Pt-2) Avail: NTIS HC A07/MF A01

The ESRO (ESA) electronic components data base was selected for the investigation of the ADABAS adaptable data base system. The data base fulfills two requirements: possibility of relating individual investigations associated with special performances of the system to each other, and presentation of relevant search inquiries for the assessment of the search functions. ESA

N77-10841# Federal Energy Administration, Washington, D.C. Office of Policy and Analysis.
DIRECTORY OF FEDERAL ENERGY DATA SOURCES: COMPUTER PRODUCTS AND RECURRING PUBLICATIONS
May 1976 84 p
(PB-254163/9; FEA/B-76/219) Avail: NTIS HC A05/MF A01 CSCL 09B

Federally sponsored energy-related information is announced. The information on magnetic tape is primarily in the form of data files. However, there are also computer programs, data base reference services, and mathematical models. The items are listed under broad subject categories. The citations include title, responsible agency, dates of coverage, accession number, availability information, and abstract. Each entry is indexed by subject, originating agency, and accession number. GRA

N77-11903# Moshman Associates, Inc., Bethesda, Md.
EVALUATION OF THE FEASIBILITY OF AN INDEPENDENT

HSA DATA BASE RELATIVE TO PROPOSED HSA BUDGETS AND STAFFING Final Report, 10 Oct. 1975 - 10 Feb. 1976
10 Feb. 1976 149 p refs Sponsored by HEW
(PB-254920/2; BHPRD-76/2) Avail: NTIS HC A07/MF A01 CSCL 06E

The feasibility of centralization of HSA data bases, standards, criteria for determining when such centralization is indicated, and methods of estimating staffing and other costs were examined. The comparative advantages (economic, data availability, etc.) of each of the following alternatives were studied: (1) HSA-maintained data base, conservatively estimated at $40,000 - $50,000 annually, (b) centralization at state level or group level, i.e., states or HSAs. It is concluded that 'when appropriate conditions are met' centralization of a data base 'can most logically and naturally occur at the state level with primary attention to the type of the data that are available from state level sources.' GRA

N77-11904# Pennsylvania Univ., Philadelphia. Wharton School of Finance and Commerce.
DAISY: AN APPLICATIONS PERSPECTIVE Interim Report
Howard Lee Morgan Nov. 1975 42 p refs Presented at Joint Wharton/ONR Conf. on Interactive Inform. and Decision Support Systems, Penn. Univ., 7 Nov. 1975
(Contract N00014-75-C-0440; NR Proj. 049-380)
(AD-A023875; Rept-75-11-03) Avail: NTIS HC A03/MF A01 CSCL 09/2

DAISY is the acronym for Decision Aiding Information System, which is being developed by the author and his colleagues in the Department of Decision Sciences at the Wharton School for the Operational Decision Aiding Systems Project of the Office of Naval Research. It is meant to give tactical level decision makers the ability to integrate the latest in information systems, modeling and probabilistic estimation techniques into their own decision making activities. It is not meant to automate decisions, but rather to aid the decision maker (DM) as an intelligent staff officer might. This particular staff officer, however, provides the DM with access to distributed data bases, powerful mathematical modeling techniques, and a means of sequencing through the decision process, taking into account the 'wisdom of the ages', (i.e., the way in which previous decision makers have acted when confronted with similar situations). This paper attempts to describe the strategy and tactics employed in DAISY with emphasis on what the user sees, in line with the Applications Perspective of this talk. Command and control applications are specifically discussed as well as private sector applications. Additional specifics which may be of more interest to implementers have been included. Author (GRA)

N77-11905# Pennsylvania Univ., Philadelphia. Wharton School of Finance and Management.
DATA STORAGE DECISIONS FOR LARGE DATA BASES Ph.D. Thesis
Jay-Louise Weldon Feb. 1976 280 p refs
(Contract N00014-67-A-0216-0007; NR Proj. 049-272)
(AD-A023874; Rept-76-02-04) Avail: NTIS HC A13/MF A01 CSCL 09/2

This dissertation presents a systematic methodology for making configuration decisions for large data bases. For each phase of the methodology, informal and operational decision aids are provided. The primary design tool described is an interactive Data Base Configuration Model (DBCM). This model was developed to aid the data base designer in evaluating and comparing the cost and performance of alternative configurations. The methodology is illustrated by its applications to the configuration of a large data base: the 1970 Census of Population and Housing. GRA

N77-12921 Polytechnic Inst. of New York.
SPARCOM: A SPARSE MATRIX ASSOCIATIVE RELATIONAL APPROACH TO DYNAMIC DATA STRUCTURING AND DATA RETRIEVAL Ph.D. Thesis
Ron Ashany 1976 257 p
Avail: Univ. Microfilms Order No. 76-23391

SPARCOM (Sparse Associative Relational Connection Matrix) is a method that was developed for the analysis, interpretation, organization, classification, update, and structure of stored data as well as for the search and retrieval of information from large data base (LDB) systems. The major problem investigated is the dynamic structuring of the data to meet the specifications of modern LDB systems for short response time and high throughput as illustrated by the requirements of several applications in a crime combating environment. Searching the data files concurrently by many queries in which many properties are specified, discovering information patterns from large amounts of data, determining the most distinctive properties of criminals, human-face identification, bullets' signature classification, inference of relationships, etc., are some of these requirements. Dissert. Abstr.

N77-13897 National Lending Library for Science and Technology, Boston Spa (England).
AN ANALYSIS OF THE FOLLOW-UP SCANNING PERFORMED BY AN APPARATUS FOR READING DIGITAL INFORMATION FROM FILM
A. A. Gurevich and L. P. Derenchenko [1976] 23 p refs Transl. into ENGLISH from Leningrad, Glav. Geof. Obs., T. Vyp. 347 (USSR), 1975 p 136-145 in ENGLISH and RUSSIAN (NLL-M-24130-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.

Technical principles of read-out of information recorded linewise on films are described. The characteristic feature of the system is the occurrence of a nonlinear link between beam deflection from the line center and the signal strength at the photo-electric system. The apparatus for dense recording of the cross-sectional dimensions of the lines of the film employs consecutive reading of the information through a scanning beam controlled by a follow-up system which ensures sufficiently precise movement of the beam along the center of the line by means of a cathode-ray tube. To record information onto the line it is most common to use a binary code with pulse manipulation. The input scanning signal is the position of the information line, the output signal the position of the cathode-ray beam projection. Reading is performed using continuously extended film. The beam is moved in both directions so that the line is scanned on the direct reading pass and the next line on the return pass. A simplified block diagram of the follow-up system and algorithms are presented herewith. I.M.

N77-15888# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
VERY LARGE PLANNER-TYPE DATA BASES
Drew V. McDermott Sep. 1975 54 p refs
(Contract N00014-75-C-0643)
(AD-A026370; AI-M-339) Avail: NTIS HC A04/MF A01 CSCL 09/4

This paper describes the implementation of a typical data-base manager for an AI language like Planner, Conniver, or QA4, and some proposed extensions for applications involving greater quantities of data than usual. The extensions are concerned with data bases involving several active and potentially active sub-data bases, or contexts. The major mechanisms discussed are the use of contexts as packets of data with free variables and indexing data according to the contexts they appear in. The paper also defends the Planner approach to data representation against some more recent proposals. Author (GRA)

N77-15896# British Library Lending Div., Boston Spa (England).
CORRELATED STRUCTURE: TEXT SEARCHING FOR CHEMICAL INFORMATION
J. Powell, J. F. B. Rowland, and M. A. Veal Jul. 1976 124 p refs
(BLL-BLRD-5292) Avail: British Library Lending Div., Boston Spa, Engl.

The Chemical Abstracts Integrated Subject File, a machine-readable data base corresponding to the six-monthly subject index of Chemical Abstracts, was used for an experiment in structure-text searching. One six-month file was used in the experiment. This was first divided into a nomenclature file, containing the systematic chemical names of all the compounds in the index and a text file, containing all other information on the file. For each of a collection of test questions, a nomenclature profile to search for the required substructures and a text profile to search for the required concepts were written. The nomenclature profiles were then searched against the nomenclature file. The resulting list of relevant compounds was then passed across to the text file, where the corresponding text profiles were used to refine the results; the compounds retrieved in the nomenclature search were linked logically to the concepts required in the text search, and only those documents satisfying both criteria were counted as hits. Author

N77-18908# Advisory Group for Aerospace Research and Development, Paris (France).
METHODOLOGY OF LARGE DYNAMIC FILES
A. K. Gillis (Harris Corp., Melbourne, Fla.) Dec. 1976 24 p (AGARD-R-649; ISBN-92-835-1233-3) Avail: NTIS HC A02/MF A01

Data collection, conversion, storage, and retrieval trends were examined. Entity formatting and element transformation were discussed as well as digital storage alternatives and storage hierarchy. Data base management, management systems software, and implementation considerations concerning data retrieval were investigated. S.M.

N77-18929# Illinois Univ., Urbana-Champaign. Coordinated Science Lab.
THE PLANES SYSTEM: NATURAL LANGUAGE ACCESS TO A LARGE DATA BASE Annual Progress Report
David L. Waltz, Timothy Finin, Fred Green, Forrest Conrad, and Bradley Goodman Jul. 1976 142 p refs
(Contract N00014-67-A-0305-0026)
(AD-A028318) Avail: NTIS HC A07/MF A01 CSCL 09/2

The PLANES system is designed to allow non-programmers to obtain information from a large relational data base by typing requests in English. PLANES can deal with pronoun reference, ellipsis and questions about itself. Examples of system operation and detailed program descriptions are included, along with discussions on the answering of vague or complex questions, browsing, the generation of clarifying dialogues with the user, adding the ability to handle new questions, and the organization and content of the data base. GRA

N77-18936# European Space Agency, Frascati (Italy). Space Documentation Service.
MAXIMISING THE USE OF AN INFORMATION SERVICE IN AN INTERNATIONAL ENVIRONMENT
W. A. Martin *In* AGARD Advan. in Retrieval Technol. as Related to Inform. Systems Dec. 1976 18 p refs

Avail: NTIS HC A08/MF A01

The development of the European Space Agency Space Documentation Service (SDS) from 1964 to date is briefly reviewed. SDS database policy, which must satisfy the needs of both the agency and its member countries, is explained and utilization trends for all major databases examined. Based on a target of self-support since 1971, the evolution of SDS charging policy and the integration of the recently introduced RTC (remote terminal concentrator) are described. The derivation of database related costs, their potential for reduction, and the useful price reductions which would result from a significant increase in overall system load factor are outlined. The consequences and implications of working in an international environment are reviewed, and the particular problems of data communications in Europe are emphasized. The exponential growth in demand for information services as indicated by recent projections is noted, highlighting the need to improve and simplify current types of service; ongoing experimental work at SDS on an integrated information base is briefly mentioned including some thoughts on the multi-lingual requirement. Author

N77-18937# Paris V Univ. (France)
A HUMAN BIOMETRY DATA BANK
A. M. Coblentz *In* AGARD Advan. in Retrieval Technol. as Related to Inform. Systems Dec. 1976 14 p In ENGLISH and FRENCH
Avail: NTIS HC A08/MF A01

The collection and use of individual anthropometric measurements gathered over several decades on a large number of world populations is reported. Data recording and reduction methods are described. Use of the data bank in equipment design is discussed. Author

N77-18939# National Bureau of Standards, Washington, D.C. Office of Standard Reference Data.
THE NATIONAL STANDARD REFERENCE DATA SYSTEM
Stephen A. Rossmassler *In* AGARD Advan. in Retrieval Technol. as Related to Inform. Systems Dec. 1976 4 p refs

Avail: NTIS HC A08/MF A01

The National Standard Reference Data System is a coordinated, but decentralized effort to increase the reliability and availability of numerical data used in and produced by the physical sciences and engineering. Individual data projects on specific technical subjects are established to extract, evaluate, and compile, in a systematic manner, all relevant data from the scientific journal and technical report literature. The evaluation process compresses the original data, and the systematic treatment aids the user in filling his data needs. Sophisticated data-handling capabilities including on-line information and data retrieval are developed in individual data centers and also in a central data systems design group. Author

N77-18941# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
DEVELOPMENT AND APPLICATIONS OF SPATIAL DATA RESOURCES IN ENERGY RELATED ASSESSMENT AND PLANNING
Richard J. Olson, F. Glenn Goff, and Jerry S. Olson *In* AGARD Advan. in Retrieval Technol. as Related to Inform. Systems Dec. 1976 7 p refs
(Publ-901) Avail: NTIS HC A08/MF A01

A spatial database for the Eastern United States at the county-subcounty unit level of resolution is described. The database contains information on terrain, water resources, climate, land use, forest resources, agriculture, wildlife resources, critical natural areas, human population and energy uses. A spatial hierarchy of metric, geodetic and geopolitical scales is defined as a framework to organizing the data. Building blocks that can be assembled or aggregated to satisfy analysis needs allow accessing more detailed spatial data by using pointers to information not stored in the database. Uses of the database are related to the capability to cross-reference and integrate information in various subject sectors, utilizing spatial units and temporal periods commensurate with regional themes. An investigation of potential changes in vegetation patterns related to predicted temperature changes from increased atmospheric CO2 is presented to illustrate an ongoing application of data resources. Other themes include coal extraction, landscape patterns, habitat and population dynamics of selected biological species, and energy facility siting. Author

N77-17832# Stanford Linear Accelerator Center, Calif.
INTERACTIVE 3D MOTION GRAPHICS WITH LARGE DATA BASES Ph.D. Thesis
S. R. Levine Mar. 1976 176 p refs
(Contract E(04-3)-515)
(SLAC-192) Avail: NTIS HC A09/MF A01

A graphic data organization was designed that allows for fast access to an arbitrarily large data base. The graphic data were organized by clustering into successively larger spheres. The derived tree structure provided for multilevel descriptions of objects that allow for display of only the amount of detail that was resolved on the display, in addition to rapid determination of data in the field of view. An algorithm was developed to search for the minimum volume sphere enclosing a set of points in three dimensions. A heuristic was used to speed the search for the minimum volume sphere gaining several orders of magnitude improvement over a nonheuristic search. ERA

N77-17933# Oak Ridge National Lab., Tenn.
NUTIS: NUMERICAL AND TEXTUAL INFORMATION SYSTEM. VERSION 1.1: A DIRECTORY AND INPUT MANUAL
R. H. Strand, R. J. Olson, and D. G. Taylor Apr. 1976 49 p refs
(Contract W-7405-eng-75)
(EDFB-IBP-75-7) Avail: NTIS HC A03/MF A01

NUTIS, the Numerical and Textural Information System, was developed to aid in managing numerous and diverse data sets generated by environmental research programs. A batch system provides efficient computer storage and retrieval of numeric data sets and associated textual descriptions. This manual describes the textual identifiers in the NUTIS directory and discusses edition and formation of new data sets, data bank policies, and data access control. Procedures and computer job decks for accessing and maintaining the data bank are presented. ERA

N77-17936# California Univ., Berkeley. Lawrence Berkeley Lab.
BDMS: BERKELEY DATA-BASE MANAGEMENT SYSTEM USER'S MANUAL, VERSION 1.2
David R. Richards Apr. 1976 31 p refs Sponsored by ERDA
(LBL-4683) Avail: NTIS HC A03/MF A01

BDMS is a general-purpose data-base management and information retrieval system with a broad range of capabilities for creating, maintaining, and accessing computer data bases. Its capabilities include a natural and easy-to-use data base definition language; a powerful editor that operates directly on the data base; extensive retrieval facilities including controlled data-base inversion, and Boolean and relational operators.
Author (ERA)

N77-17937# National Bureau of Standards, Washington, D.C.
DATA BASE DIRECTIONS: THE NEXT STEPS Final Report
John L. Berg, ed. Sep. 1976 177 p refs Conf. Proc. of the Workshop of the Natl. Bureau of Standards and the Association for Computing Machinery, Ft. Lauderdale, Fla., 29-31 Oct. 1975 Sponsored in part by the Association for Computing Machinery, Ft. Lauderdale, Fla., 29-31 Oct. 1975
(PB-258103/1; NBS-SP-451; LC-76-608219) Avail: NTIS HC A09/MF A01 CSCL 09B

A workshop of approximately 80 experts in five major subject areas was established. The five subject areas were auditing, evolving technology, government regulations, standards, and user experience. The proceedings provide guidance on steps managers should follow to prepare themselves and their organization for the installation of data base management concepts. GRA

N77-18947# Oak Ridge National Lab., Tenn.
INDICES, A TECHNIQUE FOR USING LARGE SPATIAL DATA BASES
A. H. Voelker Apr. 1976 84 p refs
(Contract W-7405-eng-26)
(ORNL-RUS-15) Avail: NTIS HC A05/MF A01

Computerized techniques for isolating factors or indices relevant to management questions and for expressing these indices in elements of a data base are presented. Indices of potential use to resource managers developed for the land-use models of the Regional Environmental Systems Analysis program (RESA) are also provided. ERA

N77-18948# Los Alamos Scientific Lab., N.Mex.
PROBLEMS ASSOCIATED WITH LARGE SCIENTIFIC DATA BASES
Jesse M. Cheadle, III 1976 21 p Presented at Conf. of Assoc. of System 2000 User's for Tech. Exchange, Austin, Texas, May 1976
(Contract W-7405-eng-36)
(LA-UR-76-1152; Conf-760545-1) Avail: NTIS HC A02/MF A01

Large data bases were encountered in the national uranium resource evaluation project. The solutions to the major problems encountered in dealing with large scientific data bases are as follows: limited disk space is not a problem if one uses PLF or PLC update codes to create or add to data bases; skewness can be minimized by occasional reorganizations; and running statistical packages can be easily accomplished by running them against data files created by the S2K 'LIST' command. ERA

N77-18949# California Univ., Livermore. Lawrence Livermore Lab.
RESEARCH LEADING TO THE PRODUCTION AND EARLY USE OF NUMERIC DATA BANKS OF MATERIAL PROPERTIES AND SYSTEM ANALYSES Quarterly Progress Report, Jan. - Mar. 1976
E. A. Henry 14 May 1976 18 p
(Contract W-7405-eng-48)
(UCRL-50038-76-1; QPR-1) Avail: NTIS HC A02/MF A01

Research was initiated leading to creation of a numerical data base of material properties. A list of tasks to be completed was compiled and a literature survey in energy storage, flywheel rotor materials, and battery-storage systems was started. ERA

N77-19928# Office of Technology Assessment, Washington, D.C.
AN ASSESSMENT OF INFORMATION SYSTEMS CAPABILITIES REQUIRED TO SUPPORT US MATERIALS POLICY DECISIONS
Dec. 1976 261 p refs
(OTA-M-40; LC-76-600077) Avail: SOD HC $3.25

The adequacy of present information systems for the technology of materials supply, processing and uses is assessed to determine what institutional adjustments are needed in the nation to provide coordinated strategic economic information and to permit analysis of economic needs for resources, commodities, materials, and manufactured products on a permanent basis.
A.H.

N77-20922# Brookhaven national Lab., Upton, N.Y.
INFORMATION CENTER AS A LINK BETWEEN BASIC AND APPLIED RESEARCH
S. Pearlstein 1976 15 p refs Presented at 5th CODATA Conf., Boulder, Colo., 28 Jun. - 1 Jul. 1976
(Contract E(30-1)-16)
(BNL-21554; Conf-760643-3) Avail: NTIS HC A02/MF A01

The National Neutron Cross Section Center (NNCSC) concerns itself with neutron physics information of a basic and applied nature. Computerized files of bibliography to the neutron physics literature, and of experimental and evaluated neutron data are maintained. The NNCSC coordinates a national effort, the Cross Section Evaluation Working Group (CSEWG) with participants from government, private, and academic institutions, to establish a computerized reference data base Evaluated Nuclear Data File (ENDF/B) for national programs. Power reactor, shield design, neutron data, radioactive decay data and radiation spectra for the burnup and after decay heat of fission products and photon interaction data for gamma ray transport calculations are covered. ERA

N77-21989# Oak Ridge National Lab., Tenn.
REGIONAL INFORMATION GROUP (RIG). ENERGY, ENVIRONMENTAL, AND SOCIOECONOMIC DATA BASES AND ASSOCIATED SOFTWARE AT OAK RIDGE NATIONAL LABORATORY
A. S. Loebl, N. S. Malthouse, D. B. Shonka, M. C. Ogle, and M. L. Johnson Oct. 1976 140 p
(Contract W-7405-eng-26)
(ORNL/TM-5800) Avail: NTIS HC A07/MF A01

The contents and organization of a machine readable data base are described. Documentation of the energy, environmental, and socioeconomic data bases is provided along with associated software. ERA

N77-22990# California Univ., Berkeley. Lawrence Berkeley Lab.

ERDA INTERLABORATORY WORK FOR DATA EXCHANGE (IWGDE) Annual Report, Fiscal year 1976
Deane Merrill, ed. and Donald Austin, ed. Sep. 1976 138 p refs Revised
(Contract W-7405-eng-48)
(LBL-5329) Avail: NTIS HC A07/MF A01

The activities of the ERDA Interlaboratory Working Group for Data Exchange (IWGDE) during fiscal year 1976 are discussed. Created in response to an evident need for increased sharing of resources among ERDA installations, IWGDE was supported in FY 1976 through funds allocated to the Energy Analysis and Assessment programs of seven multipurpose ERDA national laboratories. Principal accomplishments include the interlaboratory exchange of socio-economic, environmental, demographic, and energy-related data bases, liaison development through interlaboratory meetings, creation of a national index of energy-related models and data bases, and definition and partial implementation of a computer-independent standard for exchange of data via magnetic tape. ERA

N77-23002# Mitre Corp., Bedford, Mass.
SECURE MULTILEVEL DATA BASE SYSTEM: DEMONSTRATION SCENARIOS, VOLUME 2, REVISION 1
J. L. Mack and B. N. Wagner Oct. 1976 50 p Revised
(Contract F19628-76-C-0001)
(AD-A032956; MTR-3160-Vol-2-Rev-1; ESD-TR-76-158-Vol-2-Rev-1) Avail: NTIS HC A03/MF A01 CSCL 05/2

The operation of a multilevel secure file management system using security kernel technology has been demonstrated under MITRE Project 7070. This volume of the project's final report describes three application scenarios used for demonstration of the system, and assesses their value and limitations. Author (GRA)

N77-23005# Harry Diamond Labs., Adelphi, Md.
USING THE DATA BANK IN TACTICAL SYSTEM HARDENING AND VULNERABILITY ASSESSMENTS
Paul A. Trimmer Dec. 1976 34 p refs
(DA Proj. 1W1-62118-AH-75)
(AD-A032653; HDL-TM-76-23) Avail: NTIS HC A03/MF A01 CSCL 09/1

The data bank can be a useful tool for tactical system nuclear hardening and vulnerability assessments. This report is intended to assist the program manager in determining the extent that data banks can be used in solving his nuclear hardening or assessment problem. For programs budgeted under $250,000, a data bank can be cost effective. The results are as reliable as those obtained in a testing program, and the time saved can be considerable. The data bank and test results are compared to analytical methods of obtaining data. The analytical method gave good results for the device types investigated. GRA

N77-24001# Wisconsin Univ., Madison. Mathematics Research Center.
ON PERFORMANCE MODELLING OF DATA BASE MANAGEMENT SYSTEMS: AN INDUCTIVE APPROACH Summary Report
Allen Reiter Jul. 1976 46 p refs
(Contract DAAG29-75-0024)
(AD-A031959; MRC-TSR-1648) Avail: NTIS HC A03/MF A01 CSCL 05/8

This paper describes a simulation model in which user jobs are synthesized from basic building blocks. The modelling process consists of three stages: translation from a user view of data and processes dependent on the data base management system (DMS) into a standard form consisting of explicit access paths over logical data structures; translation of the logical structures and operations into block-oriented structures and operations on a virtual machine; and execution of a number of concurrent jobs on a real machine. This paper deals only with the last two stages. Standard forms for the logical structures and operations and for the virtual machine are described; they are as free as possible from the data view of the particular DMS. A generalized modelling framework, which becomes a model of a particular DMS when various 'plug-in' modules are added is described. The data representation features of a DMS enter as parameters for the second stage, while the resource management tactics are the parameters for the last stage. The proposed model structure is intended as a basis for DMS design experiments. Author (GRA)

N77-24003# Naval Postgraduate School, Monterey, Calif.
DEMONSTRATION OF THE FEASIBILITY OF AUTOMATING THE INFORMATION SYSTEM OF A SMALL SERVICE ORGANIZATION USING A GENERALIZED COMPUTER SOFTWARE M.S. Thesis
Kenneth M. Suess and James F. Thaler Sep. 1976 201 p refs
(AD-A033694; NPS-54CF76091) Avail: NTIS HC A10/MF A01 CSCL 05/2

The concept of using a generalized computer software package to satisfy the information processing requirements of a small service organization was introduced. The feasibility of this approach was demonstrated by applying the Statistical Package for the Social Sciences (SPSS) to the data processing requirements of a service organization. Using SPSS, an automated information system was developed and implemented in an operational environment for the Facility Engineering Support Office (FESO), a service organization at the Civil Engineering Laboratory (CEL). The development process and operating procedures were documented to facilitate the adoption of this approach by other service organizations. GRA

N77-24004# National Bureau of Standards, Washington, D. C.
TECHNICAL PROFILE OF SEVEN DATA ELEMENT DICTIONARY/DIRECTORY SYSTEMS
Belkis Leong-Hong and Beatrice Marron Feb. 1977 49 p refs
(PB-263177/8; NBS-SP-500-3; LC-76-58915) Avail: NTIS HC A03/MF A01 CSCL 09B

Data element dictionary directories (DED/D) are described and their application in the control and uniform management of data elements is discussed. Existing systems are described and classified. Technical features are presented for seven commercially available systems. GRA

N77-24005*# Operations Research, Inc., Silver Spring, Md.
UNITED STATES DATA COLLECTION ACTIVITIES AND REQUIREMENTS, VOLUME 1 Final Report
S. Hrin and D. McGregor Jan. 1977 248 p refs
(Contract NAS5-22467)
(NASA-CR-152523; TR-1124-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 05B

The potential market for a data collection system was investigated to determine whether the user needs would be sufficient to support a satellite relay data collection system design. The activities of 107,407 data collections stations were studied to determine user needs in agriculture, climatology, environmental monitoring, forestry, geology, hydrology, meteorology, and oceanography. Descriptions of 50 distinct data collections networks are described and used to form the user data base. The computer program used to analyze the station data base is discussed, and results of the analysis are presented in maps and graphs. Information format and coding is described in the appendix. Author

N77-24006*# Operations Research, Inc., Silver Spring, Md.
UNITED STATES DATA COLLECTION ACTIVITIES AND REQUIREMENTS, VOLUME 2 Final Report
S. Hrin and D. McGregor Jan. 1977 196 p refs
(Contract NAS5-22467)
(NASA-CR-152524; TR-1124-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 05B

A listing of the entire data collection station data base is presented. Author

N77-24007# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
HIGH LEVEL EXPRESSION OF SEMANTIC INTEGRITY SPECIFICATIONS IN A RELATIONAL DATA BASE SYSTEM M.S. Thesis
Dennis J. McLeod Sep. 1976 123 p refs
(Contract N00014-75-C-0661)

(AD-A034184; MIT/LCS/TR-165) Avail: NTIS
HC A06/MF A01 CSCL 09/2

The 'semantic integrity' of a data base is said to be violated when the data base ceases to represent a legitimate configuration of the application environment it is intended to model. In the context of the relational data model, it is possible to identify multiple levels of semantic integrity information: (1) the description of the domains of the data base as abstract sets of atomic data values (domain definition), (2) the specification of the fundamental structure of the relations of the data base (relation structure specification), (3) the definition of the abstract operations which are meaningful in terms of the application environment (structured operations), and (4) the expression of additional semantic information not contained in the structure of the relations nor in the identities of their underlying domains (relation constraints). A high level, nonprocedural domain definition language facilitates the description of domains. Such a language allows the specification of the properties of the values constituting a domain, and the action that is to occur if an attempt is made to update a column entry such that it does not belong to the underlying domain of that column. The specification of relation structure and structured operations can be accomplished by means of high level integrity (sub)languages. A semantic integrity subsystem (of a generalized relational data base management system) can support the generation and maintenance of integrity specifications, verify that these specifications are met by the data base, and take appropriate action if violations are detected. GRA

N77-24994# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
INDEX SELECTION IN A SELF-ADAPTIVE RELATIONAL DATA BASE MANAGEMENT SYSTEM M.S. Thesis
Arvola Y. Chan Sep. 1976 100 p refs
(Contract N00014-75-C-0661)
(AD-A034185; MIT/LCS/TR-166) Avail: NTIS
HC A05/MF A01 CSCL 09/2

The development of large integrated data bases that support a variety of applications in an enterprise promises to be one of the most important data processing activities of the next decade. The effective utilization of such a data base depends on the ability of data base management systems to cope with the evolution of data base applications. In this thesis, development of a methodology for monitoring the developing pattern of access to a data base and for choosing near-optimal physical data base organizations based on the evidenced mode of use is attempted. More specifically, the problem of adaptively selecting the set of secondary indices to be maintained in an integrated relational data base is considered. Stress is placed on the auquisition of an accurate usage model and on the precise estimation of data base characteristics, through the use of access monitoring and the application of forecasting and smoothing techniques. GRA

N77-24996# System Development Corp., Santa Monica, Calif.
ICE DEDUCTIVE PROCESSOR AND ITS INTERFACE WITH THE REL SYSTEM Final Technical Report, Jan. 1974 - Mar. 1976
Charles Kellogg and Philip Klahr Nov. 1976 308 p refs
(Contract F30602-75-C-0108; AF Proj. 4594)
(AD-A033931; RADC-TR-76-258) Avail: NTIS
HC A14/MF A01 CSCL 09/2

The ICE (Inferential Construction of Evidence) deductive processor is a prototype system for realizing plausible deductive inference in an on-line environment consisting of large quantities of both general information (inference rules or premises) and concrete data (specific facts). It facilitates data analysis by deriving implicit information from collections of data base values under user control. The ICE processor is described as is its interface with the REL system. A number of examples in the form of computer printouts are used to illustrate the operation of the current REL/ICE prototype. GRA

N77-26013*# Teledyne Brown Engineering, Huntsville, Ala. Systems Div.
STUDY OF SYSTEMS AND TECHNIQUES FOR DATA BASE MANAGEMENT Interim Report
Dec. 1976 61 p
(Contract NAS8-31488)
(NASA-CR-150278; SD76-MSFC-2060) Avail: NTIS
HC A04/MF A01 CSCL 05B

Data management areas were studied to identify pertinent problems and issues that will affect future NASA data users in terms of performance and cost. Specific topics discussed include the identifications of potential NASA data users other than those normally discussed, consideration affecting the clustering of minicomputers, low cost computer system for information retrieval and analysis, the testing of minicomputer based data base management systems, ongoing work related to the use of dedicated systems for data base management, and the problems of data interchange among a community of NASA data users. Author

N77-26018# Office of Telecommunications, Washington, D. C.
THE INFORMATION ECONOMY: USER'S GUIDE TO THE COMPLETE DATABASE (ON MAGNETIC TAPE) Final Report
Michael R. Rubin Mar. 1977 71 p
(Grant NSF APR-76-09015)
(PB-264173/6; OT-SP-77-12-9-DOC; COM-DF-77-001A) Avail: NTIS HC A04/MF A01 CSCL 05B

A user's guide to the magnetic tape containing economic data on the U.S. economy in the benchmark year 1967 is presented. The information sector of the economy is highlighted in two input-output tables, one at the 108 industry order, and the other at the 190 order level. A coefficient and inverse tables are also included for both industry schemes. In addition, tables of employee compensation by industry and by occupation for 1967 and 1970 are included. GRA

N77-26019# Texas Univ., Austin. Center for Cybernetic Studies.
SOME CONSIDERATIONS AND MODELS FOR THE DISTRIBUTION OF A DATA BASE
Joyce Elam and Joel Stutz May 1976 37 p refs
(Contracts N00014-75-C-0569; N00014-75-C-0616; NR Proj. 047-021)
(AD-A035923; CCS-279) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper presents a survey of current research in the area of distributed systems and discusses some possible areas of future research. The trend toward data base management systems which are responsible for the creation, accessing, and maintenance of a large collection of information containing complex interrelationships is prevalent in centralized systems today. It seems that the same advantages which led to the growth of data base management systems in centralized systems can be applied in distributed systems as well. Most current research, particularly in the area of modeling, views a distributed system in terms of independent data files. The authors address some of the problems involved when the distributed system is viewed in terms of an integrated data base. GRA

N77-26020# Naval Ship Research and Development Center, Bethesda, Md.
DATA BASE DESIGN
David K. Jefferson Jun. 1976 105 p refs
(TF53531009)
(AD-A035945; DTNSRDC-76-0111) Avail: NTIS
HC A06/MF A01 CSCL 09/2

In the four principal activities of data base design, (1) Identifiers and descriptors must be grouped together to form logical records. A suggested standard form and procedure for obtaining this form are described. (2) Relationships among logical records must be established by logical access paths. The hierarchical, CODASYL, and relational models and the situations in which they are applicable are described. (3) The physical form of records must be determined. Several techniques for reducing storage requirements are described. (4) The physical realizations of logical access paths must be determined. A general technique is described, examples are presented and evaluated, and specific suggestions are made for many different types of applications. Author (GRA)

N77-28034# Advisory Group for Aerospace Research and Development, Paris (France).

MAXIMIZING EFFICIENCY AND EFFECTIVENESS OF INFORMATION DATA BANKS

Y. M. Braunstein (New York Univ.) May 1977 18 p refs
Sponsored in part by NSF
(AGARD-R-657; ISBN-92-835-1243-x) Avail: NTIS HC A02/MF A01

Principles are examined underlying the efficient and effective production, transfer, and use of information. The cost savings and benefits that accrue to users from increased cooperation among the participants in the information transfer process are studied. Cooperation between producers, intermediaries, and users is covered. The impact of networking on information services is discussed. Distinctions are made among computer, communication, and information networks. Author

N77-28987*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

MULTIPURPOSE INTERACTIVE NASA INFORMATION SYSTEMS (MINIS)

Jun. 1977 45 p
(NASA-TM-78124) Avail: NTIS HC A03/MF A01 CSCL 05B

The Multipurpose Interactive NASA Information System was developed to provide remote, interactive information retrieval capability for various types of data bases to be processed on different types of small and medium size computers. Use of the system for three different data bases is decribed: (1) LANDSAT photo look-up, (2) land use, and (3) census/socioeconomic. Each of the data base elements is shown together with other detailed information that a user would require to contact the system remotely, to transmit inquiries on commands, and to receive the results of the queries or commands. Author

N77-28992# Auerbach Corp., Philadelphia, Pa.

DECISION ANALYSIS TECHNIQUE FOR PROGRAM EVALUATION (GOAL PROGRAMMING) Final Report, 1 Jun. 1976 - 29 Apr. 1977

Thomas J. McGeehan 21 Apr. 1977 149 p refs
(Contract DSA900-75-C-5161)
(AD-A038800; AUER-2325/2326-TR-4) Avail: NTIS HC A07/MF A01 CSCL 05/2

A mathematical decision model for information service planning was derived from administrative goals. Program plans are assessed in the context of performance goals for six areas: available staff, available budget, program effectiveness, functional requirements, basic service requirements, investment programs to insure future progress. The technique is an extension of linear programming that calculates optimal solutions to decision problems in the areas of resource allocation, policy analysis and program evaluation according to a set of preemptive priorities established by management. The report includes a program in FORTRAN 4 for computing solutions. Author (GRA)

N77-28993# Dartmouth Coll., Hanover, N.H. Dept. of Mathematics.

NATURAL LANGUAGE DATA BASE QUERY: USING THE DATA BASE ITSELF AS THE DEFINITION OF WORLD KNOWLEDGE AND AS AN EXTENSION OF THE DICTIONARY Technical Report, Jan. 1976 - Feb. 1977

Larry R. Harris Feb. 1977 25 p refs
(Contract N00014-75-C-0514)
(AD-A036491; TR77-2) Avail: NTIS HC A02/MF A01 CSCL 05/7

This paper raises two issues that heretofore have not been dealt with in any previous natural language data base query system. These issues arise because of the everpresent need for world knowledge in the understanding of English, and also because of the particular way in which information is stored in a data base. The solutions to these problems described in this paper require only existing state of the art data base technology. Author (GRA)

N77-30021# California Univ., Livermore. Lawrence Livermore Lab.

MONITOR OF DISTRIBUTED DATA SYSTEMS (MODDS). PART 2: DETAILED FUNCTIONAL SPECIFICATIONS

E. W. Birss, J. E. Donnelley, and J. W. Yeh 15 Nov. 1976 44 p
(Contract W-7405-eng-48)
(UCID-17314-Pt-2) Avail: NTIS HC A03/MF A01

Current problems encountered in the interactive use of geographically distributed computer services by the DOT Transportation Systems Center are described and solutions proposed to increase accountability, selection capability, usability, and control of services use. ERA

N77-30022# Oak Ridge National Lab., Tenn. Finance and Materials Div.

COMMITMENT INFORMATION SYSTEM: USER GUIDE

Ada F. Misek Feb. 1977 33 p
(Contract W-7405-eng-48)
(ORNL-TM-5408) Avail: NTIS HC A03/MF A01

A user guide is presented for a management information system which includes project scheduling, status, and reporting in its finance and materials data base. The operation of the system is described along with a discussion of the types of information input, the reports issued, options available, computer programs used, and the timing of update. Procedures are given for protecting the data base, and for deleting records. ERA

N77-32014# Illinois Univ., Urbana-Champaign. Coordinated Science Lab.

BROWSER: A USER ORIENTED INFORMATION RETRIEVAL SYSTEM

Forrest Paul Conrad Dec. 1976 46 p refs
(Contract N00014-75-C-0612)
(AD-A040637; T-38) Avail: NTIS HC A03/MF A01 CSCL 09/2

The BROWSER system was designed as a tool to aid in problem isolation, problem measurement and revision monitoring in the maintenance of aircraft by the U.S. Navy. This paper discusses how BROWSER's design accomplishes these goals. Since the overall system would require man-years to complete, only crucial sections of the code were implemented to demonstrate the system's feasibility. Since simplicity was a paramount design principle, it is not anticipated that expansion of the system will encounter extraordinary problems. Note however that the design process is an iterative one. BROWSER is a complex information retrieval system. The user interacts with the system in real time through a computer terminal. This is to be differentiated from retrieving the data on a real time basis. The data base which BROWSER operates on is so large that a majority of it resides on magnetic tape. The period of processing may span several days during which time the user can perform unrelated work. After processing the query, BROWSER notifies the user upon completion. GRA

N77-32973# Kent Univ., Canterbury (England). Computing Lab.

THE SYNTACTIC ANALYSIS OF FORMAL ENGLISH TEXT TO CREATE A STRUCTURED DATA BASE

Eveline Wilson and A. G. Ball 1977 127 p refs Sponsored by the British Library
(BLL-BLRDR-5342-(2113.56F)) Avail: British Library Lending Div., Boston Spa, Engl

The syntactic structures of some sentences from Patents, British Standards and Statutes are examined to assess their amenability to automatic analysis and restructuring to give a standardized data base. A possible data base structure is described and the problems of finding a useful yet economically acceptable parsing strategy are discussed. Areas for further investigation are suggested. Author

N77-34038# Brookhaven National Lab., Upton, N. Y.

ARCHITECTURE OF THE BNL ARCHIVE AND DISSEMINATION SYSTEM

J. Heller Dec. 1976 61 p refs
(Contract EY-76-C-02-0016)
(BNL-22445) Avail: NTIS HC A04/MF A01

The broad specifications and desires of the BNLADS are discussed from the point of view that eventually this system will operate in a nonhomogeneous computer network. Then the nature of sequential files as dealt with by the BNLADS is considered. A data definition language (DDL) is specified that is capable of describing the access sequence, formatting, and logical names of the fields of data. This DDL is used by the system for accessing sequential files and formating data for output onto user specified files. The formal specification in Baccus Naur Form (BNF) is given with a discussion of the sematics of the DDL. The architecture of the BNLADS, i.e., the stratified organization, is examined. The version used is an intersection of the PL/I which is common to all manufacturers considered. ERA

N77-34041# Advisory Group for Aerospace Research and Development, Paris (France).

SURVEY OF COMPUTER-ASSISTED WRITING AND EDITING SYSTEMS

P. I. Berman (Lockheed Electron. Co., Plainfield, N. J.) Jul. 1977 65 p refs
(AGARD-AG-229) Avail: NTIS HC A04/MF A01

The available technology for automating the preparation of technical and scientific documents was surveyed. The range of possibilities inherent in such technology was demonstrated by reviewing a number of typical system configurations. Present trends in automated publishing systems are suggested and some qualitative guidelines for selecting and implementing such systems are provided. Author

N78-10967 Houston Univ., Tex.

A PILOT SYSTEM FOR THE TEXAS ENERGY DATA BANK AND INFORMATION RETRIEVAL SYSTEM Ph.D. Thesis

Daniel Velaire Goulet 1976 511 p
Avail: Univ. Microfilms Order No. 77-13633

An energy data base for the State of Texas was developed. The Texas Energy Data Bank and Information Retrieval System (TEDBIRS) is a pilot system which consists of a data management system capable of handling time series data, a user language, and a prototype data base. The data management system consists of 16 subroutines which initialize and update all time series data to the system. The user language consists of a retrieve command, 22 analysis commands, 2 documentation commands all written in FORTRAN 4. The command structure uses simple language and syntax. The language is capable of simple extension, making it very responsive to the user's needs. The prototype data base consists of 69 energy data vectors for the State of Texas over a 22 year period. Dissert. Abstr.

N78-10980# California Univ., Livermore. Lawrence Livermore Lab.

SET THEORETIC DATA STRUCTURES (STDS): A TUTORIAL

E. W. Birss and Jeffry W. Yeh 31 Jan. 1977 52 p refs
(Contract W-7405-eng-48)
(UCID-17378) Avail: NTIS HC A04/MF A01

A data base system called Set Theoretic Data Structures (STDS) is shown to be similar to relational algebraic data base management systems. The advantages of STDS are its straightforward data base design, compact data representation, and flexible, powerful data manipulation operators, while its limitations are its low-level primitive user interface and the partial implementation of the extended set theoretic concepts. To make STDS very attractive, a user-friendly interface should be developed, and some distinctive features of extended set theory (such as sets of sets) should be implemented. ERA

N78-11150*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. DSN Data Systems Section

CONFIGURATION CONTROL AND AUDIT ASSEMBLY

A. P. Irvine *In its* The Deep Space Network 15 Oct. 1977 p 166-171
Avail: NTIS HC A11/MF A01 CSCL 05B

The Configuration Control and Audit Assembly Project is responsible for the implementation of a computer-based system for acquiring, managing and distributing a subset of the Deep Space Network Data Base of operational and management information. Author

N78-11867# Federation of Rocky Mountain States, Inc., Denver, Colo.

A GENERAL DESIGN SCHEMA FOR AN OPERATIONAL GEOGRAPHIC INFORMATION SYSTEM: REGION SIX, U.S. FISH AND WILDLIFE SERVICE

Larry Salmen, George Nez, Carl Reed, John Hamill, and James Gropper Jun. 1977 50 p Sponsored in part by EPA
(Contract DI-14-16-0008-2155)
(PB-269275/4; FWS/OBS-77/22) Avail: NTIS HC A03/MF A02 CSCL 05B

A general system design is presented, and a basic set of system capabilities is outlined for a proposed U.S. Fish and Wildlife Geographic Information System. The system is to operate at two levels. One is a manual system for cataloging maps, revelant articles, and other paper documents. The second level is the automated level. At the automated level, a computer based information system will allow for data input, data analysis, and information output based on user specified criteria. GRA

N78-13861# Battelle Pacific Northwest Labs., Richland, Wash.

COMPREHENSIVE INFORMATION RETRIEVAL AND MODEL INPUT SEQUENCE (CIRMIS)

D. R. Friedrichs Apr. 1977 82 p ref
(Contract EY-76-C-06-1830)
(BNWL-2235) Avail: NTIS HC A05/MF A01

A computer system developed to increase data storage and retrieval capabilities and ground-water model control is described. The overall configuration, however, can be used in other areas to provide the user with three major functions: retrieval of well-based data, special application for manipulating surface data or background maps, and the manipulation and control of ground-water models. These programs comprise only a portion of the entire comprehensive information retrieval and model input sequence system. ERA

N78-14843# Brookhaven National Lab., Upton, N. Y.

BNL ARCHIVE AND DISSEMINATION SYSTEM

S. Abbey, K. Fuchel, J. Heller, K. S. Lin, and L. Osterer Feb. 1977 27 p refs Presented at SIGMOD Intern. Conf. on Management Data, Toronto, Canada, 3 Aug. 1977
(Contract EY-76-C-02-0016)
(BNL-22424; Conf-770805) Avail: NTIS HC A03/MF A01

The Brookhaven National Laboratory Archive and Dissemination System (BNLADS) is designed to deal with the record keeping associated with archiving and disseminating sequential files through a computer network. This data base management system (DBMS) is implemented in a host language that is a subset of PL/I. The stored sequential files that can be dealt with by the BNLADS must be in character mode (ASCII, BCD, EBCDIC). The accessing of fields is specified by a format description which allows for forward processing of fields only. The structure of a case type statement allows for a data field determining a format sequence from a set of format sequences. A data description language (DDL) was devised to describe the accessing sequences of stored sequential files. A data model definition gives the user a view of the content of each stored sequential file. ERDA

N78-15948*# Alabama A & M Univ., Normal. Dept. of Natural Resources and Environmental Studies.

AN EVALUATION OF CODING METHODOLOGIES FOR POTENTIAL USE IN THE ALABAMA RESOURCE INFORMATION SYSTEM (ARIS)-TRANSPORTATION STUDY FOR THE STATE OF ALABAMA

Oscar L. Montgomery Dec. 1977 35 p
(Grant NGR-01-001-023)
(NASA-CR-150480) Avail: NTIS HC A03/MF A01 CSCL 05B

Procedures developed for digitizing the transportation arteries, airports, and dock facilities of Alabama and placing them in a computerized format compatible with the Alabama Resource Information System are described. The time required to digitize by the following methods: (a) manual, (b) Telereadex 29 with film reading and digitizing system, and (c) digitizing tablets was evaluated. A method for digitizing and storing information from the U. T. M. grid cell base which was compatible with the system was developed and tested. The highways, navigable waterways, railroads, airports, and docks in the study area were digitized and the data stored. The manual method of digitizing was shown to be best for small amounts of data, while the graphic input from the digitizing tablets would be the best approach for entering the large amounts of data required for an entire state. Author

N78-20017# SRI International Corp., Menlo Park, Calif.
MECHANICAL INTELLIGENCE: RESEARCH AND APPLICATIONS Final Technical Report, 12 Apr. 1976 - 9 Oct. 1977
Earl D. Sacerdoti, Richard E. Fikes, Gary G. Hendrix, Paul Morris, and Daniel Sagalowicz Nov. 1977 167 p refs
(Contract DAAG29-76-C-0012; ARPA Order 2894)
(AD-A049027) Avail: NTIS HC A08/MF A01 CSCL 05/2

This report summarizes the results of a research project whose goal is to develop computer systems that can provide easy access for nontechnicians to large, distributed data bases of information. Our goal has been to develop mechanisms for automating many of the detailed tasks that today are normally performed by a decision maker's technical staff. These include accepting a question, in natural (not necessarily grammatical) English, in the decision maker's own terms; planning a sequence of queries to various files to gather the requested information; developing the plan into a computer program or programs in the language of the data base management system on which the data resides; transmitting the retrieval programs, and monitoring their execution; and composing the information retrieved into a suitable output format. We have focused our efforts along two mutually supporting lines of research. First, we have created a performance system, called LADDER (for Language Access to Distributed Data with Error Recovery), that carries out all of the functions listed above in at least rudimentary form. Our second line of research focuses on longer-term efforts to develop the techniques required to satisfy more fully the needs of decision makers. GRA

N78-20999 Washington State Univ., Pullman.
A STRUCTURE FOR THE ORGANIZATION AND MAINTENANCE OF LARGE ORDERED DIRECTORIES Ph.D. Thesis
James Alma Larson 1977 101 p
Avail: Univ. Microfilms Order No. 78-00416

The technique uses a tree structured directory which can be easily implemented on electromagnetic storage media. Computers can be used to search this directory efficiently and provide the appropriate response quickly. A new class of search trees, C-trees, was defined. C-trees are a generalization of the B-tree file structure proposed by Bayer and McCreight. Two other important dynamic search tree structures were shown to be equivalent to subclasses of C-trees. Storage utilization, average tree depth, and average number of keys in each node were derived for C-tree structures resulting from a large number of deletions. A technique to compare various insertion strategies is presented. Transformations are described which may be applied locally to decrease the insertion cost. Dissert. Abstr.

N78-21001# Mechanical Properties Data Center, Traverse City, Mich.
[OPERATION, DEVELOPMENT, AND ACTIVITIES OF MECHANICAL PROPERTIES DATA CENTER] Annual Report, 16 Sep. 1976 - 15 Sep. 1977
Robert C. Braden Dec. 1977 37 p
(Contract DSA900-76-C-0861)
(AD-A050399; AMMRC-TR-78-3; AR-14) Avail: NTIS HC A03/MF A01 CSCL 05/2

This report reviews and discusses the continuing operation and development of the Mechanical Properties Data Center. Activity and growth of the Center are discussed in terms of the six major work areas: Input, File Maintenance, Output, Systems Development, Management and Marketing-Sales. Author (GRA)

N78-21003# Ballistic Research Labs., Aberdeen Proving Ground, Md.
STORAGE AND RETRIEVAL OF INFORMATION ON SYSTEMS OF PARTIAL DIFFERENTIAL EQUATIONS AND THEIR SOLUTIONS: CREATABASE AND THE CONTINUUM/MECHANICS CENTER DATA BASE OF HYDROCODES
Morton A. Hirschberg, Joseph Lacetera, and James A. Schmitt Sep. 1977 47 p
(AD-A050307; BRL-2015) Avail: NTIS HC A03/MF A01 CSCL 09/2

A Continuum Mechanics Center has been established for the purposes of evaluating and developing models of interacting continua. Because of the large and growing body of literature concerning such models and related computer codes, the vast number of assumptions made in their use, and the varying types of numerical methods utilized in these codes, a data base analysis system, CREATABASE, was used to store information and characteristics of the different codes. This paper briefly describes CREATABASE, delineates the data base, describes queries made on the data base, and outlines future uses and expansion of the data base and the data base analysis system. Author (GRA)

N78-21007# California Univ., Livermore. Lawrence Livermore Lab.
SCIENTIFIC DATA BASE MANAGEMENT AT LAWRENCE LIVERMORE LABORATORY: NEEDS AND A PROTOTYPE SYSTEM
Edward W. Birss, Stephen E. Jones, Daniel R. Ries, and Jeffry W. Yeh 3 Oct. 1977 14 p refs Presented at OECD/NEA Working Group on Nucl. Inform., Berkeley, Calif., 5-7 Oct. 1977
(Contract W-7405-eng-48)
(UCRL-80146; Conf-771062-1) Avail: NTIS HC A02/MF A01

A prototype scientific data base management system which uses a relational algebraic interactive use language is described. The software is comprised of a microprocessor, a parser, a parse tree generator, a parse tree interpreter, semantic routines, and data base access routines. ERA

N78-21996# California Univ., Livermore. Lawrence Livermore Lab.
DECISION MAKING WITH INTERACTIVE ACCESS TO INTEGRATED ADMINISTRATIVE AND TECHNOLOGICAL DATA BASES. AN ILLUSTRATED CONCEPTUAL OVERVIEW
Viktor E. Hampel 14 Sep. 1977 64 p refs Presented at ERDA/AESOP 17th Conf., Boston, 13-15 Sep. 1977 Submitted for publication
(Contract W-7405-eng-48)
(UCRL-80353; Conf-770937-3) Avail: NTIS HC A04/MF A01

A computer based Integrated Information System intended to support the ongoing research and development work in the energy storage area of energy research and to permit comparative decision making by computer and cost/risk/benefit analyses is described. Bibliographic and numeric reference materials on batteries employing aqueous and high temperature electrolytes, molten salt energy storage, alloys and fiber composites of flywheels, and for hydrogen-based energy storage compounds, and evaluation criteria on the performance of energy storage systems are compiled in the data base and are accessible interactively from remote terminals. Features of the system include accessibility over computer networks and by dial-up over telephone lines and conferencing and electronic mail delivery with a VOTRAX voice synthesizer. ERA

N78-22996# Minnesota Univ., Minneapolis. Wilson Library.
COMMERCIAL DATA BASE MANAGEMENT SYSTEM (DBMS) SOFTWARE IN LARGER MINICOMPUTER CONFIGURATIONS
Audrey N. Grosch *In* AGARD The Appl. of Inexpensive Minicomputers to Inform. Work Mar. 1978 10 p ref

Avail: NTIS HC A05/MF A01

Data base management system (DBMS) software is compared to data management system (DMS) software and a brief historical overview of development and use is presented as a background to a discussion of DBMS and the design of online systems for libraries. Some questions are posed to help a given library determine whether it should use a DBMS approach in its online system within a minicomputer or conventional computing environment. The data structures supported, the language facilities, the minimal hardware configurations, and various other component features of several minicomputers are discussed. Various systems are compared from the standpoint of potential of bibliographic systems use. Author

N78-23999# Mound Lab., Miamisburg, Ohio.
INTERACTIVE DATA MANAGEMENT AND ANALYSIS SYSTEM FOR THE EASTERN GAS SHALE PROGRAM
Purtle W. Seabaugh and Ronald E. Zielinski 1977 8 p refs Presented at the Eastern Gas Shale Program Conf., Morgantown, W.Va., 17 Oct. 1977
(Contract EY-76-C-04-0053)
(MLM-2469(OP); Conf-771038-5) Avail: NTIS HC A02/MF A01

A versatile, easy to use data base system is described. The system provides flexibility in display formats as well as input and output options such as format compatibility adaptive to field data. Versatility is attained through logical, Boolean, and arithmetic expressions. Consequently, computational capability is available so that data input can be minimized. Browsing and recursive searches are available through a search criteria command that allows the user to modify and narrow the request without restart. The system provides plotting options; data can be plotted in a well profile format. Through GEOLOG, a softwired synergistic log system, well log data can be integrated with geochemical and geophysical experimental data. This integration will provide a more accurate assessment of the resources potential of the well. Utilization of these features provides not only a fully interactive data management system but also an enhanced statistical capability for data analysis. ERA

N78-24996# Hughes Aircraft Co., Fullerton, Calif. Ground Systems Group.
PRELIMINARY NTIP SYSTEM CONCEPT AND ALTERNATIVE CONFIGURATIONS. ADDENDUM: CONCEPT OF THE USER-DATA MATCH MODEL
27 Jan. 1978 145 p
(Contract N00600-76-C-1352)
(AD-A051312; FR-77-12-150-ADD) Avail: NTIS HC A07/MF A01 CSCL 05/9

The objectives and approach to the development of the user-data match model are outlined and conclusions and recommendations are provided. The approach to the development of the model considers analysis of personnel characteristics, selection of ratings for the user sample, ranking of ratings by aptitude test scores, and analysis of Navy training and experience requirements. Analysis of task characteristics considers maintenance of task data sources, development of task action data base, definition of levels of hardware complexity, and analysis of presentation techniques. Identification of presentation components relates human factors principles to technical information including readability findings involving TM users. G.G.

N78-26995# California Univ., Livermore. Lawrence Livermore Lab.
REQUIREMENTS FOR THE DESIGN OF A SCIENTIFIC DATA BASE MANAGEMENT SYSTEM
V. E. Hampel and D. R. Ries 30 Sep. 1977 22 p refs Presented at OECD/NEA Working Group on Nucl. Inform., Berkeley, Calif., 5 Oct. 1977 Revised
(Contract W-7405-eng-48)
(UCRL-80171-Rev-1; Conf-771082-5) Avail: NTIS HC A02/MF A01

Probable causes for the absence of a portable generalized data base management system for scientific data at the DOE National Laboratories are discussed. An effective system should work equally efficiently with vectors, matrices, arrays, plex variables, space data and text and be capable of storing and displaying data with the customary scientific notations and attributes in different units of measurement. The user should be able to use the system as a programmable calculator for simple mathematical tasks, and extract and transfer data to model or application program for more difficult calculations. The system should permit common access to a library of interrelated data bases and references tables, as well as expansion to an integrated information system on computer networks with distributed resources. The user should be given a reasonable, English-like command language to start, but should also have the option to create dialects and extensions of the system for personal and programmatic needs. ERA

N78-27985# Federal Computer Performance Evaluation Simulation Center, Washington, D. C.
MV-027-033-ARMY EVALUATION OF DBMS MODELING APPROACHES
Feb. 1978 144 p refs
(AD-A053829) Avail: NTIS HC A07/MF A01 CSCL 05/1

This report presents the results of FEDSIM's evaluation of the Information Processing System Simulator (IPSS), the Extendable Computer System Simulator (ECSS), and DIMUI -- A Performance Evaluation System for Data Base Management with respect to their data base management system/computer system modeling capabilities, modeling support facilities, and program product qualities. Author (GRA)

N78-27987# Los Alamos Scientific Lab., N. Mex.
USING SYSTEM 2000 WITH PROPOSED ANSI STANDARDS FOR THE DATA EXCHANGE
Carmen M. Benkovitz and Richard A. Wiley 1977 27 p Presented at the Assoc. of System 2000 Users for Tech. Exchange Fall Conf., San Francisco, 17-19 Oct. 1977
(Contract W-7405-eng-36)
(LA-UR-77-2739; Conf-771074-2) Avail: NTIS HC A03/MF A01

In 1976 the Energy Research and Development Administration (ERDA) Interlaboratory Working Group for Data Exchange developed a standard for the generalized exchange of data bases using magnetic tape. This, subsequently, became the proposed American National Standard Specifications for an Information Data Descriptive File. This report describes the development of a mechanism for conversion of SYSTEM 2000 data bases to or from interchange files conforming to the proposed standard and vice versa. Two phases are discussed. Phase one requires that the user supply the data base definition, and uses loader string files for conversion. Phase Two will be a completely automated process using the Programming Language Interface. This phase requires no prior knowledge of the data base structure or content at execution time. ERA

N78-27988# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Science.
FACILITATING DATA INTERCHANGE WITH ERDA
C. M. Benkovitz 1977 22 p refs Presented at the VIM 26 Conf., Minneapolis, 3-7 Apr. 1977
(Contract EY-76-C-02-0016)
(BNL-22595; Conf-770445-2) Avail: NTIS HC A02/MF A01

Resources of the seven ERDA multipurpose national laboratories and the advantages of sharing them are pointed out. A standard for the interchange of data among the laboratories was developed. Features of the proposed standard and its implementation are described. Author (ERA)

N78-31940# Telecom, Inc., Vienna, Va.
BASELINE NATIONAL AIRSPACE DATA INTERCHANGE NETWORK (NADIN) DATA BASE
Jun. 1978 48 p
(Contract DOT-FA74WA-3264)
(AD-A056112; FAA-RD-78-95) Avail: NTIS HC A03/MF A01 CSCL 01/2

The current Baseline National Airspace Data Interchange Network (NADIN) subscriber data base is described in terms of existing terminal types, population, and circuit configuration for Service B; National, Pacific and Carribbean AFTN. Also, included are current service A weather and request reply subscriber data. G.G.

N78-32918 Southern Illinois Univ. at Carbondale.
AN AXIOMATIC TREATMENT OF INFORMATION STORAGE AND RETRIEVAL IN SYSTEMS Ph.D. Thesis
Kristin Freye Thulin Kocan 1978 172 p
Avail: Univ. Microfilms Order No. 7813555

Attempts are made to relate the concepts of information theory to time semi-system theory. Such concepts include information storage capacity, coding, redundancy, and reliability. In particular, system redundancy is quantified, and a reliability function is defined such that it is an objective system parameter. These achievements allow for optimization of redundancy or reliability. Attempts are also made to derive criteria for the existence of specific proposed mechanisms for memory in living organisms. In order to fulfill this purpose, time semi-system theory is related to a type of biological system, the central nervous system. This approach yields logical implications concerning proposed memory mechanisms. These implications are derived from experimental data using the framework of time semi-system theory. Dissert. Abstr.

N78-33004# Naval Postgraduate School, Monterey, Calif.
THE DESIGN AND IMPLEMENTATION OF INSTRUCTIONAL SOFTWARE INFORMATION SYSTEM (ISIS) M.S. Thesis
Ataman Yildirim Jun. 1978 103 p refs
(AD-A056323) Avail: NTIS HC A06/MF A01 CSCL 05/2

This thesis describes the design, implementation and user interface for an Instructional Software Information System (ISIS). The existing volume and increasing rate of growth of computer software production suggests the need for a catalogue procedure to help programmers find existing software to reduce redundant programming. The purpose of the ISIS is to provide an online software catalogue which does not require either prior instruction or familiarity with keyword lexicons. Using ISIS, a user may record the characteristics of new software, and make searches for existing software by specifying its characteristics. Characteristics are specified by selection from a succession of menus. ISIS is implemented on a PDP-11 computer operating under the UNIX operating system using the INGRES data base management system. It is written in the QUEL query language embedded in the programming language C. Author (GRA)

N78-33005# Engineering Societies Commission on Energy, Inc., Washington, D. C.
ESCOE INFORMATION RETRIEVAL SYSTEM. SYSTEM DESCRIPTION AND OPERATION
W. J. Costley Apr. 1978 41 p refs
(Contract EF-77-C-01-2468)
(FE-2468-26) Avail: NTIS HC A03/MF A01

The Engineering Societies Commission Energy (ESCOE) Technical Information Retrieval System is described. The technical information needs of the ESCOE resident engineers in providing services to DOE were identified, and the information resources that best match those needs were examined. The assessment of information needs resulted in the selection of an ESCOE information base. The best mix of information sources and services was selected, and a remote terminal was acquired to access those sources that are available as computerized data bases. ERA

N79-11946# California Univ., Berkeley. Lawrence Berkeley Lab.
AUTOMATIC DATABASE MAPPING AND TRANSLATION METHODS
D. F. Cahn and J. J. Herr Apr. 1978 13 p refs Presented at 4th Conf. of Cybernetics and Systems, Amsterdam, Netherlands, 21 Aug. 1978
(LBL-6782; Conf-780815-1) Avail: NTIS HC A02/MF A01

Automatic methods for content-directed translation and information mapping among machine-readable databases are considered. Multicategory decision algorithms, tested against the classification decisions of human experts in a bibliographic document classification task, matched human performance to the 88 percent level and showed several key parametric sensitivities. The algorithms tested were based on prior state (experiential) descriptor and category usage, and can be configured to provide incremental adaptation or learning. Techniques used emanate from the pattern recognition and artificial intelligence fields. DOE

N79-11948# Sandia Labs., Albuquerque, N. Mex.
COMPUTER BASED MECHANICAL PROPERTY DATA STORAGE AND RETRIEVAL SYSTEM SUITABLE FOR FINITE-ELEMENT ELASTIC-PLASTIC STRUCTURAL ANALYSIS
H. J. Rack and R. Babb May 1978 68 p
(Contract EY-76-C-04-0789)
(SAND-77-1930) Avail: NTIS HC A04/MF A01

A computer based mechanical property data storage and retrieval system suitable for use with advanced finite-element, elastic-plastic structural analysis codes is described. This system is based upon a linkage between the Hewlett-Packard HP-9830 calculator and the CDC-6600 Network Operating System. It is capable of accepting various data input forms and cataloging them for future reference. Subsequent search routines are allowed with specific data sets to be retrieved, the retrieval being accomplished on the basis of individually selected key materials related descriptors, e.g., heat treatment, test temperature, etc. DOE

N79-11951# Sandia Labs., Albuquerque, N. Mex.
MATERIALS INFORMATION DATA BANK
K. E. Mead Mar. 1978 35 p
(Contract EY-76-C-04-0789)
(SAND-77-0735-Suppl-A) Avail: NTIS HC A03/MF A01

To assist in materials selection, a computerized materials data bank was established. In addition to references on personnel and documents, this data bank provides annotated information on materials so that the designer and materials engineer can draw on it for guidance in selecting materials. The primary purpose of the data bank is to provide materials compatibility data. However, the structure of the system permits the data bank to be used for storage and retrieval of general materials information. G.Y.

N79-12962*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
NSSDC DATA LISTING
Sep. 1978 34 p
(NASA-TM-79762) Avail: NTIS HC A03/MF A01 CSCL 05B

The National Space Science Data Center (NSSDC) Data Listing is in an abbreviated form compared to the data catalogs normally published by NSSDC/WDC-A-R&S. It is organized by NSSDC spacecraft common name. The launch date and NSSDC ID are printed for each spacecraft. The experiments are listed alphabetically by the principal investigator's name and NSSDC ID are printed for each experiment. The data sets are listed by NSSDC ID following the experiment name. The data set name, data form code, quantity of data, and the time span of the data as verified by NSSDC are printed for each data set. Information on NSSDC facilities and ordering procedures are included. A.R.H.

N79-12963# Naval Postgraduate School, Monterey, Calif.
LOGICAL DATA BASE DESIGN FOR RELATIONAL DATA BASE SYSTEMS M.S. Thesis
Jack Albert Chapman Jun. 1978 63 p refs
(AD-A057902) Avail: NTIS HC A04/MF A01 CSCL 09/2

Theories and guidance for logical data base design have lagged far behind the advances in physical data base design. The advent of sophisticated data base management systems has relieved the user of many of the problems of physical data base design, but has placed more emphasis on good logical design. The theory behind logical data base design is explored and a step by step procedure for the logical data base design is explored and a step by step procedure for the logical data base design is presented, employing mathematical and operations research techniques. Author (GRA)

N79-12966# Illinois Univ. at Urbana-Champaign, Urbana. Coordinated Science Lab.
DATA BASE MAPPING MODEL AND SEARCH SCHEME TO FACILITATE RESOURCE SHARING. VOLUME 1: MAPPING OF CHEMICAL DATA BASES AND MAPPING OF DATA BASE ELEMENTS USING A RELATIONAL DATA BASE STRUCTURE Final Report
Martha E. Williams, Scott E. Preece, Sandra H. Rouse, and Keith MacLaury Dec. 1977 342 p refs 2 Vol
(Grant NSF SIS-74-18558)

(PB-283892/8; T-56-Vol-1) Avail: NTIS HC A15/MF A01 CSCL 09B

The chemical identifiers used in 181 machine-readable bibliographic numeric, and algorithmic sources of chemical data were studied. Computer programs forming a prototype mapping system were constructed and used to generate indirect linkages joining virtually all pairs of data resources by mapping paths of direct linkages to and among resources that can function as translators, changing the form of the supplied data so they can function as input to the desired data resource or to another translator. A generalized set of data elements capable of containing the majority of information contained in existing data bases was identified. Those data elements were formed into a hierarchical structure of compound and single elements, and the feasibility of automatically mapping existing data bases into that structure was demonstrated. GRA

N79-12980# Illinois Univ. at Urbana-Champaign, Urbana. Coordinated Science Lab.
DATA BASE MAPPING MODEL AND SEARCH SCHEME TO FACILITATE RESOURCE SHARING. VOLUME 2: DIRECTORY OF CHEMICAL DATA BASES Final Report
Martha E. Williams Dec. 1977 448 p 2 Vol.
(Grant NSF SIS-74-18558)
(PB-283893/6; T-56-Vol-2) Avail: NTIS HC A19/MF A01 CSCL 09B

Data describing the format and contents of 181 chemical data bases are presented as a directory of chemical data. Areas included are: (1) basic information; (2) producer/distributor/generator information; (3) availability and charges for data base tapes; (4) subject matter and scope of data on tape; (5) subject analysis indexing data including all types of chemical identifiers used in the data base; (6) bibliographic data base elements on tape; (7) tape specifications; (8) search programs; (9) data base services offered; and (10) user aids offered by data base producer. GRA

N79-12981# Northwestern Univ., Evanston, Ill. Vogelback Computing Center.
PROFILE EVALUATION, RESEARCH AND MODELLING FOR SCIENCE INFORMATION SYSTEMS: A REPORT ON THE DEVELOPMENT OF A GENERALIZED EVALUATION METHODOLOGY TO STUDY USER INTERACTION Final Report, 1 Sep. 1976 - 28 Feb. 1978
Lorraine Borman and W. Dominick (Louisiana Southwestern Univ., Lafayette) Jun. 1978 258 p
(Grant NSF DS-176-19481)
(PB-283979/3; VCC/ISS-78/001) Avail: NTIS HC A12/MF A01 CSCL 05B

The behavioral and performance patterns of individuals using interactive information systems were studied to identify factors which serve to improve use of such systems and develop a generalized evaluation methodology. Data collection was accomplished through automated interaction monitors within two information systems at different universities, with many data bases and a broad user community. A series of questions covered such factors as system usage, errors and error recoveries, user experience, and success and satisfaction with the system. The methodology consisted of defining the evaluation objectives, isolating monitoring parameters, constructing behavior indicators, and performing statistical analyses. GRA

N79-12982# Sigma Data Computing Corp., Rockville, Md.
A STUDY OF SYSTEM REQUIREMENTS FOR IMPLEMENTING A CHEMICAL SUBSTANCES INFORMATION NETWORK Final Report
Oct. 1977 211 p refs Sponsored in part by EPA and Natl. Library of Med.
(Contract EQ4AC003)
(PB-284030/4; CS-101) Avail: NTIS HC A10/MF A01 CSCL 05B

Specifications for the Chemical Data Bases Directory and the Chemical Structure/Nomenclature System are discussed. Current computer security techniques for protecting confidential data are reviewed and methods for meeting the requirements of EPA's Office of Toxic Substances and their integration with the proposed Chemical Substances Information Network are explored. GRA

N79-13017# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SYSTEM SURVEY WITH A VIEW TOWARD UTILIZING A BLACK-END DATA BASE PROCESSOR M.S. Thesis
Lester Emil Nagel Mar. 1978 104 p refs
(AD-A058513; AFIT/GCS/EE/78-5) Avail: NTIS HC A06/MF A01 CSCL 05/1

Members of the Air Force Military Personnel Center (AFMPC) want to investigate the feasibility of utilizing a back-end data base processor system configuration for the AFMPC personnel data management system. This thesis surveys the current system, the personnel management organization (AFMPC), the back-end data base processor concept, and the general requirements of the system. The basic problems of the current system are that it is heavily utilized, and the data base files cannot be updated on a timely basis because of the heavy workload. The back-end data base processor concept is relatively new and may provide a solution to these problems. Consequently, a discussion of the back-end concept, its advantages, and disadvantages is presented. In addition, the general requirements of the system are discussed and are divided into two categories: functional requirements, and system requirements. GRA

N79-15828# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
TWO PAPERS ON RANGE SEARCHING: A SURVEY OF ALGORITHMS AND DATA STRUCTURES FOR RANGE SEARCHING. EFFICIENT WORST-CASE DATA STRUCTURES FOR RANGE SEARCHING Interim Report
Jon Louis Bentley, Jerome H. Friedman (Stanford Linear Accelerator Center, Calif.), and H. A. Maurer Aug. 1978 48 p
(Contract N00014-76-C-0370)
(AD-A060584; CMU-CS-78-136) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report contains two independent papers on range searching. A range search retrieves from a file all records which conjunctively satisfy a set of range requirements for the keys; that is, each key must lie in some specified range. Range searching arises in many applications, such as data base management and statistical computing. The first paper in this report, 'A survey of algorithms and data structures for range searching' by J. L. Bentley and J. H. Friedman, describes the known 'logical structures' which can be used for range searching and then discusses the implementation of those structures in different storage media. This paper is slanted towards the practitioner. The second paper, 'Efficient worst-case data structures for range searching' by J. L. Bentley and H. A. Maurer, is more theoretical. Two new classes of data structures are proposed for range searching, establishing bounds on the asymptotic complexity of the problem. Author (GRA)

N79-15829# Computer Corp. of America, Cambridge, Mass.
A DISTRIBUTED DATABASE MANAGEMENT SYSTEM FOR COMMAND AND CONTROL APPLICATIONS Semiannual Technical Report, 1 Jan. - 30 Jun. 1978
30 Jun. 1978 133 p refs
(Contract N00039-77-C-0074)
(AD-A060441; CCA-78-10; SATR-3) Avail: NTIS HC A07/MF A01 CSCL 15/7

This report summarizes the third six month period of a project entitled, 'A Distributed Database Management System for Command and Control Applications' which has been undertaken by CCA and sponsored by ARPA-IPTO. The primary focus of this effort is to design and implement a distributed database management system called SDD-1 (System for Distributed Databases). SDD-1 is specifically oriented toward command and control applications and will be installed in phases and tested in the Advanced Command and Control Architectural Testbed (ACCAT) at the Naval Ocean Systems Center (NOSC) in San Diego. The motivation behind building a distributed database management system like SDD-1 is to take advantage of the decreasing cost of distributed processing environments and at the same time respond to the increasing data handling needs of geographically distributed organizations. SDD-1 permits data to be managed on a network of computers in an integrated environment that presents the user with the illusion that he is dealing with a centralized DBMS. GRA

N79-16794# Joint Publications Research Service, Arlington, Va.

BASIC DIRECTIONS IN RESEARCH ON THE PROBLEMS OF SCIENTIFIC MEDICAL INFORMATION

Yu. A. Shilina *In its* Transl. on USSR Sci. and Technol.: Biomed. and Behavioral Sci., No. 55 (JPRS-72716) 29 Jan. 1979 p 41-48 Transl. into ENGLISH from Sov. Zdravookhr. (Moscow), no. 12, 1978 p 25-30

Copyright. Avail: NTIS HC A05/MF A01

Information system for centralizing scientific medical information were examined. Various aspects of data processing were discussed, such as computer programs, information retrieval, data bases, etc. Further research into information services was recommended with an increased effectiveness of data to support scientific research and practical public health. J.A.M.

N79-17288*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

DATA ANALYSIS TECHNIQUES

Fabian C. Polcyn (ERIM), Kenneth R. Piech (Calspan Corp.), Allen Shapiro (NRL), Larry B. York, and Andrew E. Potter *In its* Skylab EREP Investigations Summary 1978 p 257-342 refs Original contains color illustrations

Avail: NTIS MF A01; SOD HC CSCL 05B

A multisensor data base for assessing the use of standard information extraction techniques is developed. Photographic, electro-optical mechanical, and microwave sensors were used to investigate. The space flight performance of EREP remote sensors is evaluated and data analysis techniques used for each sensor are summarized. Microdensitometry and color encoding, multiband image enhancement and analysis, digitization and computer techniques, and wavelengths are reported. S.E.S.

N79-17737# Michigan Univ., Ann Arbor. Graduate School of Business Administration.

DATA TRANSLATOR USER MANUAL VERSION 2B RELEASE 1.1

Eric Kintzer Sep. 1977 549 p refs
(Contract DCA100-75-C-0064)
(AD-A061498; AD-E100112; TR-77-DT-8) Avail: NTIS HC A23/MF A01 CSCL 09/2

The Version IIB Release 1 Data Translator User Manual is intended to provide a complete guide for a WWMCCS H-6000 or 600 user in the use of the University of Michigan software built to restructure IDS databases. The manual contains an overview of the restructuring process, guides in writing the necessary Data Translator Specifications, control card set-ups, examples of output, and error message explanations. GRA

N79-18808*# Computer Sciences Corp., Huntsville, Ala.

MINIS: MULTIPURPOSE INTERACTIVE NASA INFORMATION SYSTEM

Dec. 1976 315 p
(Contract NAS8-30775)
(NASA-CR-150405) Avail: NTIS HC A14/MF A01 CSCL 05B

The Multipurpose Interactive NASA Information Systems (MINIS) was developed in response to the need for a data management system capable of operation on several different minicomputer systems. The desired system had to be capable of performing the functions of a LANDSAT photo descriptive data retrieval system while remaining general in terms of other acceptable user definable data bases. The system also had to be capable of performing data base updates and providing user-formatted output reports. The resultant MINI System provides all of these capabilities and several other features to complement the data management system. The MINI System is currently implemented on two minicomputer systems and is in the process of being installed on another minicomputer system. The MINIS is operational on four different data bases. Author

N79-20010*# California Univ., Santa Barbara. Remote Sensing Unit.

GEOBASE INFORMATION SYSTEM IMPACTS ON SPACE IMAGE FORMATS

D. S. Simonett, ed., T. R. Smith, ed., W. Tobler, ed., D. G. Marks, ed., J. E. Frew, ed., and J. C. Dozier, ed. Apr. 1978 137 p refs Workshop held at Santa Barbara, Calif., 11-15 Sep. 1977
(Contract NASw-3118)
(NASA-CR-158406; SBRSU-TR-3) Avail: NTIS HC A07/MF A01 CSCL 05B

As Geobase Information Systems increase in number, size and complexity, the format compatability of satellite remote sensing data becomes increasingly more important. Because of the vast and continually increasing quantity of data available from remote sensing systems the utility of these data is increasingly dependent on the degree to which their formats facilitate, or hinder, their incorporation into Geobase Information Systems. To merge satellite data into a geobase system requires that they both have a compatible geographic referencing system. Greater acceptance of satellite data by the user community will be facilitated if the data are in a form which most readily corresponds to existing geobase data structures. The conference addressed a number of specific topics and made recommendations. G.Y.

N79-21941# National Bureau of Standards, Washington, D. C. Office of Standard Reference Data.

OMNIDATA: AN INTERACTIVE SYSTEM FOR DATA RETRIEVAL, STATISTICAL AND GRAPHICAL ANALYSIS, AND DATA-BASE MANAGEMENT: A USER'S MANUAL

Joseph Hilsenrath Sep. 1978 294 p refs
(PB-290349/0; NBS-Handbook-125; LC-78-600076) Avail: NTIS HC A13/MF A01 CSCL 09B

The Omnidata system, consisting of 45 individual programs written in XBASIC, provides an interactive user-oriented facility for: data retrieval and report generation; plotting and other graphical analysis; arithmetical and statistical analysis; curve fitting and multiple linear regression; data coding and decoding; survey and questionnaire analysis; author, title, and keyword indexing of bibliographic files; a variety of univariate analyses and two-way crosstabulations; and numerous utility modules for file definition, file updating, and file maintenance. The SEARCH module which performs a serial search through a file allows for: the usual Boolean operations; string searching on text fragments, stems, or roots in either the anchored or unanchored mode; specification of syntactical order and proximity of words or phrases, as well as variable length ellipsis; and ignoring one or more of a specified list of characters in its matching operation. GRA

N79-22962# CTEC, Inc., Falls Church, Va.

ALERT CAPABILITY SUPPORT

Oct. 1978 52 p refs
(Contract N00014-77-C-0551)
(AD-A064104; CTEC-7810022) Avail: NTIS HC A04/MF A01 CSCL 05/2

Examines the existing distributed data base file allocation models and gives a breakdown of the models by type (deterministic one-phase, deterministic multi-phase, stochastic discrete, stochastic continuous). The relationships and identities used to describe the models are divided into four categories: file information and parameters, transmission characteristics, computer characteristics, and costs. In the investigations which led to this paper it was seen that the means defined were initially very general. The models included relationships which were very detailed in their description of the file allocation problem. In previous analyses using these models, simplifications were often made for computational tractability. Many of the assumptions and models ended up so restricted in scope or detail as to be unrealistic. There is a great need for more work in this area. Author (GRA)

N79-24892*# Business and Technological Systems, Inc., Seabrook, Md.

A CONCEPTUAL DESIGN FOR AN INTEGRATED DATA BASE MANAGEMENT SYSTEM FOR REMOTE SENSING DATA Final Report

Paul A. Maresca and R. Michael Lefler Sep. 1978 408 p refs
(Contract NAS5-24360)
(NASA-CR-159926; BTS-FR-78-65) Avail: NTIS HC A18/MF A01 CSCL 05B

The requirements of potential users were considered in the design of an integrated data base management system, developed to be independent of any specific computer or operating system, and to be used to support investigations in weather and climate. Ultimately, the system would expand to include data from the agriculture, hydrology, and related Earth resources disciplines. An overview of the system and its capabilities is presented. Aspects discussed cover the proposed interactive command language; the application program command language; storage and tabular data maintained by the regional data base management system; the handling of data files and the use of system standard formats; various control structures required to support the internal architecture of the system; and the actual system architecture with the various modules needed to implement the system. The concepts on which the relational data model is based; data integrity, consistency, and quality; and provisions for supporting concurrent access to data within the system are covered in the appendices. A.R.H.

N79-25821 Minnesota Univ., Minneapolis.

ACCELERATED SEARCHING STRATEGIES IN LARGE, HIGHLY STRUCTURED DATA BASES Ph.D. Thesis

Thomas P. Sturm 1978 257 p
Avail: Univ. Microfilms Order No. 7912087

The problems involved in storing, organizing, and searching large data bases are examined. Of particular concern are data bases in which complex structural interrelationships between data items must be preserved. A systems point of view to accelerate associative searches which have low hit ratios in these large, highly structured data bases is taken. Three aspects of the data base management problem are examined: the storage hardware, the data base organization, and the searching strategies. Hardware technology is examined and it is concluded that large data bases can make effective use of back-end hardware features currently under development. The data base organization is examined and it is concluded that clustering is the most effective way to store the data. The concept of a pattern bit map is developed to take advantage of back-end hardware and clustered data organization. Dissert. Abstr.

N79-25822 Commission of the European Communities, Luxembourg.

EURONET: A NEW COMPREHENSIVE INFORMATION UTILITY FOR THE EUROPEAN USER

H. Ungerer 1978 12 p refs
Avail: Issuing Activity

The European online information network EURONET is an EEC project which aims at merging current and future publicly available online information services in the member states into a common network on a cooperative basis. The status of the project to date is reviewed, details on the intended services are provided, and some aspects of its impact on the European information environment are analyzed. Author (ESA)

N79-25823*# General Electric Co., Houston, Tex. Space Div.

AUTOMATED SYSTEM FOR INTEGRATION AND DISPLAY OF PHYSIOLOGICAL RESPONSE DATA Final Report

30 Jun. 1975 59 p refs
(Contract NAS9-12932)
(NASA-CR-141933; TIR-741-MED-5013) Avail: NTIS HC A04/MF A01 CSCL 05B

The system analysis approach was applied in a study of physiological systems in both 1-g and weightlessness, for short and long term experiments. A whole body, algorithm developed as the first step in the construction of a total body simulation system is described and an advanced biomedical computer system concept including interactive display/command consoles is discussed. The documentation of the design specifications, design and development studies, and user's instructions (which include program listings) for these delivered end-terms; the reports on the results of many research and feasibility studies; and many subcontract reports are cited in the bibliography. A.R.H.

N79-25824# System Development Corp., Santa Monica, Calif.

RESEARCH ON DEDUCTIVE INFERENCE FOR LARGE DATA BASES Final Technical Report, 1 Apr. 1976 - 30 Dec. 1978

Charles Kellogg and Iris Kameny 31 Jan. 1979 135 p refs
(Contract N00014-76-C-0885; ARPA Order 3182)
(AD-A066384; SDC-TM-6263/00) Avail: NTIS HC A07/MF A01 CSCL 09/2

The research has as its major goal the construction of software tools to aid on-line decision makers and data base users in accessing information relevent to their needs, in understanding the full data base search implications of their requests, and in reviewing and evaluating the utility of derived answers. The conceptual framework within which this research has been carried out is based upon mathematical logic. It is becoming increasingly clear that logic is, highly relevant not only to reasoning about data but to query language design, to data structuring, to the support of high level user views, to maintaining the integrity of data bases, and to making the transition from present day data-based systems to future knowledge-based systems. The main software tool that has been implemented as part of this research is called DADM (for Deductively Augmented Data Management). This report describes the design, implementation, and current capability of this prototype system. DADM adds a general knowledge base and a deductive processor to a data management system. These components are used to control the creation of intelligent data base access strategies and the construction of evidence to support derived answers. GRA

N79-25825# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.

ROBUST CONCURRENCY CONTROL FOR A DISTRIBUTED INFORMATION SYSTEM Ph.D. Thesis

Warren A. Montgomery Dec. 1978 200 p refs
(Contract N00014-75-C-0661)
(AD-A066996; MIT/LCS/TR-207) Avail: NTIS HC A09/MF A01 CSCL 09/2

This dissertation presents a collection of protocols for coordinating transactions in a distributed information system. The system is modeled as a collection of processes that communicate only through message passing. Each process manages some portion of the data base, and several processes may cooperate in performing a single transaction. The thesis presents a model for computation in a distributed information system in which the sites and communication links may fail. The effects of such failures on the computation are described in the model. The thesis discusses implementation techniques that could be used to limit the effects of failures in a real system to those described in the model. A hierarchical protocol for coordinating transactions is presented. The accesses to be performed during a transaction are pre-analyzed to select the protocols needed to coordinate the processes that participate in the implementation of the transaction. This analysis can be used to guide the organization of the data base so as to minimize the amount of locking required in performing frequent or important transactions. An important aspect of this mechanism is that it allows transactions that cannot accurately be pre-analyzed to be performed and correctly synchronized without severely degrading the performance of the system in performing more predictable transactions. A novel approach to the problem of making updates at several different sites atomically is also discussed. This approach is based on the notion of a polyvalue, which is used to represent two or more possible values for a single data item. A polyvalue is created for an item involved in an update that has been delayed due to a failure. GRA

N79-27010# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences.

A DATABASE INTERFACE TO WAND FOR THE NETWORK ALERTER SERVICE Technical Report, Apr. 1978 - Mar. 1979

James Steven Ribeiro Dec. 1978 53 p refs
(Contract N00014-75-C-0462; NR Proj. 049-272)
(AD-A066993; Rept-78-11-02) Avail: NTIS
HC A04/MF A01 CSCL 09/2

The Database Interface (DBI) is responsible for monitoring conditions on a data base managed by a particular type of Database Management System (DBMS). At the Wharton School there are several large databases which are managed by WAND, a CODASYL-like DBMS. This thesis outlines the design and implementation of a DBI for WAND. The DBI will be integrated into the Network Alerter Service (NAS) which is being designed and implemented as a general user service for ARPANET users. The NAS will allow the monitoring of databases at various sites on the ARPANET, for conditions of interest to the user. The WAND DBI is capable of efficiently monitoring these conditions or alerters, and responding appropriately when the previously specified condition occurs. This monitoring must be done efficiently since the performance of the DBMS may otherwise become extremely degraded.

Author (GRA)

N79-27011# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences.

Q. A COMMUNICATIONS QUERY LANGUAGE FOR SEED Technical Report, Apr. 1978 - Mar. 1979

Jonathan Hayward, Rajeev Sangal, and O. Peter Buneman May 1978 25 p refs
(Contract N00014-75-C-0462)
(AD-A066994; Rept-78-05-02) Avail: NTIS
HC A02/MF A01 CSCL 09/2

The advent of computer networking has made increasingly important the task of designing languages with which another program may talk to a database system. The DATACOMPUTER supports a query language which was designed to be generated by other programs. It maintains a quasi-relational database system with no direct linking between records. Q is an attempt to do the same thing for a network database: specifically SEED, which is a codasyl like system developed at the Wharton School.

Author (GRA)

N79-27012# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences.

EXTENSIBLE DATA BASES Technical Report, Apr. 1978 - Mar. 1979

Jonathan W. Hayward May 1978 68 p refs
(Contract N00014-75-C-0462)
(AD-A067015; Rept-79-03-08) Avail: NTIS
HC A04/MF A01 CSCL 09/2

Traditional database systems only allow queries to be made about the data within the database, rather than about the data as well as the structure of the data. A set of primitive operations is proposed which allow a flexible means of entering and exploring the data and the structure of a database. Author (GRA)

N79-27013# Pennsylvania Univ., Philadelphia. Dept. of Decision Science.

CONTROL PROGRAMS AND DATA STRUCTURES FOR A MULTIPLE ALERTER IMPLEMENTATION IN A RELATIONAL DATA BASE Technical Report, Apr. 1978 - Mar. 1979

Carlos J. Serra Dec. 1978 112 p refs
(Contract N00014-75-C-0462)
(AD-A067168; Rept-79-03-07) Avail: NTIS
HC A06/MF A01 CSCL 07/2

This paper describes the control programs and data structures used to implement multiple alerters in a relational data model environment. Alerters provide data base management systems with the capabilities of dynamically monitoring for the presence of user defined states of the data, and executing some predetermined action as a consequence of their detection. One of the main considerations in the implementation of an alerter system on a relational data base is the efficiency with which a change to a virtual relation can be detected. Programs are described for the definition, maintenance and evaluation of virtual relations. This work includes details of the use of construction diagrams as a means for their representation, as well as descriptions of the techniques for avoiding unnecessary recomputation and, when required, efficiently performing partial evaluation.

Author (GRA)

N79-27016# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences.

THE MULTIPLE PATH PROBLEM IN DATA BASE SCHEMATA Technical Report, Apr. 1978 - Mar. 1979

O. Peter Buneman Jan. 1979 21 p refs
(Contract N00014-75-C-0462)
(AD-A067147; Rept-79-03-06) Avail: NTIS
HC A02/MF A01 CSCL 09/2

Certain database query systems, especially those that interpret natural language, do not require the user to have comprehensive knowledge of the database schema in order to form a meaningful query. Instead, the query is used to reference entities in the database schema and a path is automatically found through the schema which connects those entities. In this paper, we will classify those schemata in which all paths are equivalent, and then derive a method of marking a schema in order to determine the natural paths between two entities when different paths give rise to different results.

Author (GRA)

N79-27018# Oak Ridge National Lab., Tenn. Information Div.

INVENTORY OF DATA BASES, GRAPHICS PACKAGES, AND MODELS IN DEPARTMENT OF ENERGY LABORATORIES

C. R. Shriner, ed. and L. J. Peck, ed. Nov. 1978 278 p refs
(Contract W-7405-eng-26)
(ORNL-EIS-144) Avail: NTIS HC A13/MF A01

A central inventory of energy-related environmental bibliographic and numeric data bases, graphics packages, integrated hardware/software systems, and models was compiled to facilitate on-line data retrieval on the DOE/RECON system. The data descriptions are organized under major data types and include descriptions of subject content, documentation, and contact persons. Also provided are computer data such as media on which the item is available size of the item computer on which the item executes, minimum hardware configuration necessary to execute the item, software language(s) and/or data base management system utilized, and character set used. Additional data provided to define the model more accurately include a general statement of algorithms, computational methods, and theories used by the model; organizations currently using the model; the general application area of the model; sources of data utilized by the model; model validation methods, sensitivity analysis, and procedures; and general model classification. DOE

N79-27020# Computer Horizons, Inc., Cherry Hill, N. J.

INTERNATIONAL SCIENCE INDICATORS: DEVELOPMENT OF INDICATORS OF INTERNATIONAL SCIENTIFIC ACTIVITY USING THE SCIENCE CITATION INDEX Final Report

Mark Carpenter Mar. 1979 370 p
(Grant NSF SRS-77-22770)
(PB-293033/7) Avail: NTIS HC A16/MF A01 CSCL 05B

The manual covers the methodologies of scientific literature indicators prepared for the Science Indicators Unit of NSF for the period 1970-1976. Detailed descriptions are provided of the data base, classification procedures, and the indicators themselves. The progressive development of analytic methods with emphasis on those used for the 1975 data set is explained. Strengths and weaknesses of the various methods and indicators are delineated.

GRA

N79-28004# Research Inst. of National Defence, Stockholm (Sweden).

PERFORMANCE EVALUATION OF A PROTOTYPE RELATIONAL DATA BASE HANDLER FOR TECHNICAL AND SCIENTIFIC DATA PROCESSING

Per Svensson Dec. 1978 53 p refs
(FOA-C-20281-D8) Avail: NTIS HC A04/MF A01

The concept of constructing a general support system for technical and scientific data processing, based on modern theories and methods for data storage and retrieval, was studied. The design, programming, and performance evaluation of a prototype high-performance data handler for a relational data base system has been completed. The results of the performance evaluation, which was carried out as a comparison with a commercially available data base system are presented. Author (ESA)

N79-29086 University of Southwestern Louisiana, Lafayette.
A METHODOLOGY FOR THE INFERENTIAL DERIVATION OF RETRIEVAL SEMANTICS UTILIZING A RELATIONAL VIEW OF A META-BASE Ph.D. Thesis
Thomas Richard Cousins 1978 164 p
Avail: Univ. Microfilms Order No. 7915003

A methodology through which noncomputer professionals may interact directly with an information system for specification, interpretation and resolution of their information needs is addressed. Specific topics addressed are: (1) the structure, content, and applicability of an auxiliary data base (the meta-base) as an underlying support mechanism and the basis of a methodology, and (2) the detection and use of semantic and structural interrelationships (access paths) within a user's target data base. Also described is the design, implementation and evaluation of an information retrieval system which employs the meta-base centered design methodology. The resultant system includes a partial implementation of the theoretical access paths. Dissert. Abstr.

N79-29087 California Inst. of Tech., Pasadena.
CARTAM: THE CARTESIAN ACCESS METHOD FOR DATA STRUCTURES WITH N-DIMENSIONAL KEYS Ph.D. Thesis
Stephen Petersen 1979 196 p
Avail: Univ. Microfilms Order No. 7915594

The Cartesian Access Method (CARTAM) is a data structure and its attendant access program is designed to provide rapid retrievals from a data file based upon multidimensional keys: for example, using earth surface points defined by latitude and longitude, retrieve all points within x nautical miles. The data structure and program are described in detail and the actual routines as implemented on the International Business Machine (IBM) System/370 series of computers are provided. The search technique is analogous to the binary search for a linear sorted file and seems to run in O(log(N)) time. An indication of the performance is the extraction, in less than 25 milliseconds CPU time on an IBM 370, Model 3033, of all points within a 10,000-foot circle from a geographic data base containing approximately 100,000 basic records. Dissert. Abstr.

N79-29088 Purdue Univ., Lafayette, Ind.
INCORPORATION OF DATABASE SYSTEMS CONCEPTS INTO SIMULATION MODELING Ph.D. Thesis
Charles Robert Standridge 1978 254 p
Avail: Univ. Microfilms Order No. 7914977

A database system tailored for use in simulation modeling, SIMDABS, was designed and implemented in the FORTRAN computer programming language. This system is a tool for use by simulation modelers in the organization, storage and retrieval of all data concerning a simulation study. Furthermore, SIMDABS provides simulators a framework in which to develop simulation models. Data dependent, complex logic may be more easily implemented within simulation computer programs. Commands which allow the simulators to reorganize, analyze and then retrieve data within these programs are provided. Dissert. Abstr.

N79-29089 Purdue Univ., Lafayette, Ind.
DYNAMIC CLUSTERING TECHNIQUES FOR PHYSICAL DATABASE DESIGN Ph.D. Thesis
Jo-Mei Chang 1978 219 p
Avail: Univ. Microfilms Order No. 7914882

The problem of performing multiple attribute clustering in a dynamic database is studied. The extended K-d tree method is presented. In an extended K-d tree organization, the basic K-d tree structure after modification is used as the structure of the directory which organizes the data records in the secondary storage. The implementation of the extended K-d tree storage structure and its basic access methods of a DEC PDP 11/70 using the UNIX operating system are described. The design of the discriminator function is described. A heuristic approach to the problem of directory attribute selection is proposed. The comparison of the performance of the extended K-d tree method and existing multiple attribute retrieval methods are presented. Dissert. Abstr.

N79-29100# Naval Ship Research and Development Center, Bethesda, Md.
GIRS (GRAPH INFORMATION RETRIEVAL SYSTEM) USERS MANUAL
Irving S. Zaritsky Apr. 1979 194 p refs
(AD-A068204; DTNSRDC-79-036) Avail: NTIS HC A09/MF A01 CSCL 09/2

The Graph Information Retrieval System (GIRS) provides a convenient and efficient technique for the insertion, retrieval, modification, and deletion of data in a data base. This technique is based on a scheme of representing the various data items as nodes and establishing the relationships between the nodes by linking them together into node-link-node triples which are assembled into a graph that can be stored on disk. GIRS is made up of 15 FORTRAN subroutines. It has been implemented on the CDC 6700, the PDP 11/45, and the UNIVAC 1108 computing systems, and can easily be adapted to other machines having FORTRAN IV compilers. The implementation and use of GIRS are described. GRA

N79-30089# Paris-Sud Univ., Orsay (France). Lab. de Physique des Plasmas.
ACTIVITIES REPORT ON THE DATA BASE GAPHYOR FOR 1978-1979 Annual Report, 1978 [RAPPORT D'ACTIVITE GRAPHYOR - ANNEE 1978- ET PROJETS POUR 1979]
J. L. Delcroix Dec. 1978 18 p In FRENCH
(LP-11) Avail: NTIS HC A02/MF A01

The data base, GAPHYOR, is presented as an automatic documentation system containing information on the properties of atoms and molecules. Data available includes energy levels, half lives, dipolar moments, polarizability as well as data on interaction properties between particles and macroscopic properties of the corresponding gases and plasmas. User requirements are discussed and ways in which GAPHYOR can be helpful are suggested. Improvements being made on the system are also reviewed in detail. Author (ESA)

N79-31073# Martin Marietta Aerospace, Denver, Colo.
MODELING A LARGE SCALE DATA BASE Final Report
T. W. Connolly Griffiss AFB, N. Y. RADC Apr. 1979 65 p refs
(Contract F30602-77-C-0142; AF Proj. 4594)
(AD-A069470; MCR-78-1405; RADC-TR-79-47) Avail: NTIS HC A04/MF A01 CSCL 09/2

This document reports the methods and results of a study of a large database through use of modeling concepts and simulation software. The simulation software had been developed using the concepts of the four level structure of the Data-Independent Accessing Model (DIAM) and the nomenclature and concepts of the Relational Model. The study was undertaken to assess the feasibility of applying these concepts to modeling a large existing database--in this case, the USAF's PACER database--and to demonstrate the use of existing components of query compiler software used to implement the concepts. The report describes a model of the information content of a subset of the PACER database; the model is expressed as n-ary relations. In a subsequent phase of the study, the investigators developed a model of the access paths in the PACER system. The model uses the 'strings' of the DIAM descriptive technique. Based on analysis of the results, the author concludes that DIAM concepts enhanced by Relational Model nomenclature can serve well as the basis for study of large databases and that prototype software correctly compiles all paths applicable to an input query. GRA

N79-31074# Illinois Univ. at Urbana-Champaign. Coordinated Science Lab.

AN ANALYSIS OF STORAGE, RETRIEVAL, AND UPDATE COSTS FOR DATA BASES WHICH ARE TABLES OF ENTRIES M.S. Thesis

Mark Kenneth Warner Jun. 1978 63 p refs
(Contract DAAB07-72-C-0259; Grant NSF ENG-75-20864)
(AD-A069763; R-816; UILU-ENG-78-2209) Avail: NTIS HC A04/MF A01 CSCL 05/2

The performance of retrieval systems for tables of entries is investigated. The system costs considered are the cost of storing a representation of a table, the cost of retrieving an individual table entry, and the cost of updating the table by adding or deleting the last entry. Several systems are presented and their costs are analyzed. For each type of cost a lower bound is derived, though in some cases it is for a restricted situation (such as for bounded table size). It is found for the problem presented that the actual storage cost and the lower bound on storage cost are both on the order of l(w+lg(l)), where l is the number of entries in the table and w is the entry size. The bounds on both retrieval cost and update cost are found to be on the order of w, while the actual costs of the best systems presented are on the order of w+lg(l). GRA

N79-31075# Naval Intelligence Processing System Support Activity, Alexandria, Va.

INTEGRATED DATABASE DEVELOPMENT AND DESIGN GUIDE, VERSION 2.0

May 1979 586 p refs
(AD-A069868; NIPSSA-UM-8000/2.0-5/79) Avail: NTIS HC A25/MF A01 CSCL 09/2

The NIPSSA Integrated Database Development and Design Guide is the result of several years of experience developing integrated database applications. It brings together into a structured methodology techniques which have survived trial by implementation. Some of the procedures within the Guide are relatively new and may require additional clarification. The Development of an integrated database is an expensive and highly detailed project. The speed with which applications can be added or enhanced is directly proportional to the analysis resources available. The most time-consuming part of the analysis is the definition of the data elements and their relationships. Once this is done the remainder of the design effort falls rapidly into place. The Guide provides a step-by-step set of instructions which lead to a subsystem implementation of the user's desired application. At the same time it will permit the user, who knows more about the data than anyone else, to perform the initial phases of the analysis. The Guide is meant to provide the complete picture and steps required to implement a database application. For this reason, all of the procedures to be followed by both user and Data Administration (DA) personnel are included. GRA

N79-33099 Stanford Univ., Calif.

THE INTEGRATED COMPUTER DATABASE AS A MEDIUM FOR THE MANAGEMENT AND ACCESS OF TEXTUAL INFORMATION Ph.D. Thesis

Jesse Michael Caton 1978 297 p
Avail: Univ. Microfilms Order No. 7808771

The design, implementation, application, and evaluation of a system for the computer-based management of textual information with emphasis on the particular problems encountered in developing responsive computer documentation systems are presented. Dissert. Abstr.

N79-33102# Oak Ridge National Lab., Tenn.

USER'S GUIDE TO PROGRAM MAD: A COMPUTER PROGRAM FOR THE ORGANIZATION AND MANIPULATION OF MAGNETIC TAPE DIRECTORIES

W. H. Gray May 1979 39 p refs
(Contract W-7405-eng-26)
(ORNL/TM-6597) Avail: NTIS HC A03/MF A01

MAD is a computer program for the organization and manipulation of the information contained in magnetic tape directories. Program MAD creates, updates, and interrogates a set of four random access files collectively called the MAD unified data base. Although program MAD was originally intended as an information compression mechanism, it has evolved into an organization system with the added feature of an approximately 60% reduction in the space required to store the data. This program is easy to use, relatively fast, efficient in its use of disk space, and available to all users of the Fusion Energy Division DECsystem-10. DOE

N79-33104# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.

ON SEARCH PERFORMANCE FOR CONJUNCTIVE QUERIES IN COMPRESSED, FULLY TRANSPOSED ORDERED FILES

Per Svensson (Res. Inst. of Natl. Defence) 1979 19 p refs
(TRITA-NA-79-08) Avail: NTIS HC A02/MF A01

A file organization method, providing very high performance for a large class of associative queries, is abstractly defined. The organization may be viewed both as a development of the fully transposed file, and as a generalized sort. Its average search performance is modeled under some simplifying assumptions. Also, the model predictions are compared with measurement results obtained from a prototype system and a qualitative agreement is found. For purposes of comparison, analytical and measured cost curves for fully transposed file search are also given. Author (ESA)

N79-34077 Pennsylvania State Univ., University Park.

STORAGE ALLOCATION FOR ACCESS PATH MINIMIZATION IN NETWORK-STRUCTURED DATA BASES Ph.D. Thesis

Johann Petur Malmquist 1979 197 p
Avail: Univ. Microfilms Order No. 7922314

A restricted network-structured data base (degree and block size bounded) is defined. The problem of finding an optimal partition for the restricted network-structured data base is shown to be NP-complete. An algorithm for partitioning sparse matrices is analyzed to show that it approximates the optimal partition. Cases of two SET types and two or three record types are introduced and the allocation of record occurrences to physical storage blocks under implementation methods (CHAIN and POINTER-ARRAY) is discussed. For two of the cases introduced the similarities between the partition problem of sparse matrices and the allocation of record occurrences to physical storage blocks when CHAIN implementation is used are shown. Dissert. Abstr.

N79-34079 Ohio State Univ., Columbus.

PERFORMANCE ANALYSIS AND DESIGN METHODOLOGY FOR IMPLEMENTING DATABASE SYSTEMS ON NEW DATABASE MACHINES Ph.D. Thesis

Jayanta Banerjee 1979 301 p
Avail: Univ. Microfilms Order No. 7922448

An analytical study is made of the storage requirement and performance of database machines with respect to those of conventional general-purpose computers. With a realistic choice of database parameters, it is shown that database systems (hierarchical, CODASYL or relational) normally require a slightly increased amount of storage when supported on a database machine. However, the index storage requirement and execution time of user requests are both reduced by as much as one or more orders of magnitude. Dissert. Abstr.

N79-34080 Ohio State Univ., Columbus.

A METHODOLOGY FOR THE PERFORMANCE EVALUATION OF DATA BASE SYSTEMS: AN EXTENSION OF THE IPSS METHODOLOGY, VOLUMES 1 AND 2 Ph.D. Thesis

Joseph Dale Brownsmith 1979 504 p
Avail: Univ. Microfilms Order No. 7922460

The information processing system simulator IPSS/DBS design facility was applied to the analysis of an on-line, real-time application of IDMS, a CODASYL based data base management system. The host-backended computer architecture allowed multiple users on-line access to the data. Several models of the system

were prepared and analyzed. Initial results indicate that the methodology and its implementation as IPSS/DES are well suited to the analysis of network-like data base systems. Statistics related to both software and data structure were obtained and were shown to be sensitive to design parameter variations.
Dissert. Abstr.

N79-34081 California Univ., Los Angeles.
SEMANTIC INTEGRITY, CONSISTENCY AND CONCURRENCY CONTROL IN DISTRIBUTED DATABASES Ph.D. Thesis
Dusan Zdenek Badal 1979 241 p
Avail: Univ. Microfilms Order No. 7921367

A run time semantic integrity (SI) validation method is proposed and shown to be superior to other validation methods in terms of the cost of data base accesses in centralized data bases and in terms of communication overhead in distributed data bases. Within each SI classification there are several classes of SI assertions that are evaluated at different cost with different delays. Strategies to further decrease the cost and improve the performance of SI validation of transactions are elaborated. In addition, results on the correctness of concurrency control, degree of concurrency, and reliability of concurrency control are derived and proved. A detailed comparative analysis of timestamp and locking based concurrency control approaches leads to the proposal of two concurrency control mechanisms, one being very robust and based on timestamps, and the other having high performance and very low communication overhead.
Dissert. Abstr.

N79-34086# Purdue Univ., Lafayette, Ind. Center for Information and Numerical Data Analysis and Synthesis.
THERMOPHYSICAL AND ELECTRONIC PROPERTIES INFORMATION ANALYSIS CENTER (TEPIAC): A CONTINUING SYSTEMATIC PROGRAM ON DATA TABLES OF THERMOPHYSICAL AND ELECTRONIC PROPERTIES OF MATERIALS Final Report, 1 Jan. 1977 - 31 Dec. 1978
Cho-Yen Ho Mar. 1979 94 p refs
(Contract DSA900-77-C-3758)
(AD-A071240; AMMRC-TR-79-21) Avail: NTIS HC A05/MF A01 CSCL 05/2

The objective of TEPIAC operations is to increase the productivity of scientists, engineers, and technicians engaged in scientific and engineering programs for the Department of Defense by maintaining a comprehensive, authoritative, and up-to-date national data base on thermophysical and electronic (including also electrical, magnetic, and optical) properties of materials for use by the entire DOD community and by providing authoritative data and information analysis services. Its major functions are to search, collect, review, evaluate, appraise, analyze, synthesize, and summarize the available scientific and technical data and information from worldwide sources on the various thermophysical, electronic, electrical, magnetic, and optical properties of materials and to disseminate the results both by providing authoritative data and information directly to the individual users through technical and bibliographic inquiry services and by publishing major reference works on property data and information for the general users at large.
GRA

N79-34087# RAND Corp., Santa Monica, Calif.
AN INTRODUCTION TO THE ISIS INTERACTIVE INFORMATION SYSTEM
Herbert J. Shukiar, Charles H. Bush, and Robert C. Gammill Apr. 1979 103 p
(Contract F49620-77-C-0023)
(AD-A071005; RAND/R-2435-AF) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report describes in a tutorial manner ISIS, an interactive data base management system developed on the PDP11 computer under the UNIX timesharing system. ISIS, designed for computer-naive users, uses an English-like command language to give the user the ability to view, modify, and otherwise reorganize his data base. ISIS operates on data bases of modest size, exploiting the unique characteristics associated with such data bases. The tutorial focus is tactical command and control, but ISIS is more generally applicable. The report introduces the ISIS command language in stages, and the user with access to Rand's PDP11/70 can try ISIS out on the command and control data base utilized in the report. The report also discusses the system development philosophy adopted during ISIS implementation.
GRA

N79-34092# American Geological Inst., Falls Church, Va.
DESIGN OF AN EXPERIMENTAL COOPERATIVE NETWORK FOR SHARING INFORMATION AND DATA RESOURCES IN GEOLOGY Final Report, 1 Oct. 1977 - 31 Mar. 1979
Dec. 1978 156 p refs
(Grant NSF DSI-77-07829)
(PB-296286/8) Avail: NTIS HC A07/MF A01 CSCL 09B

A network to provide information services through computer terminals linked by telephone to the State Geological Surveys is described. The participating Surveys would control and fund the network. Initially its capabilities would be modest, limited to a few clearly-defined functions and requiring less than a full time person in each Survey. Five Surveys were visited to learn first hand their network-related needs. The technologies of networking, teleconferencing, and telefacsimile were examined in relation to the needs. State-of-the-art reports on these technologies are contained.
GRA

N80-10867# System Development Corp., Santa Monica, Calif.
DEDUCTIVE PLANNING AND PATHFINDING FOR RELATIONAL DATA BASES
Charles Kellogg, Philip Klahr, and Larry Travis (Wisconsin Univ., Madison) 1978 22 p refs
(Contract N00014-76-C-0885)
(AD-A070801) Avail: NTIS HC A02/MF A01 CSCL 05/2

Inference planning techniques have been implemented and incorporated within a prototype deductive processor designed to support the extraction of information implied by, but not explicitly included in, the contents of a relationally structured data base. Deductive pathfinding and inference planning are used to select small sets of relevant premises and to construct skeletal derivations. When these skeletons are verified, the system uses them as plans to create data-base access strategies that guide the retrieval of data values, to assemble answers to user requests, and to produce proofs supporting those answers. Several examples are presented to illustrate the current capability of the prototype Deductively Augmented Data Management (DADM) system.
GRA

N80-12960# General Research Corp., McLean, Va.
ANALYSIS TO DETERMINE FUNCTIONAL AND SYSTEMS REQUIREMENTS FOR AN ON-LINE STRUCTURE AND COMPOSITION SYSTEM (SACS) Final Report
Francis O. Deppner, John J. Anderson, and Whitney C. Scully Aug. 1979 61 p refs
(Contract MDA903-78-C-0445)
(AD-A072947; GRC-1070-05-79-CR) Avail: NTIS HC A04/MF A01 CSCL 05/2

Previous reports have identified all current and developing procedures that are either directly or indirectly involved in the SACS process. Those reports also pointed out how these systems/procedures did or did not support the on-line SACS. This report now delineates what modifications must be made to the current and developing systems/procedures, and identifies new requirements that must be fulfilled to make the on-line SACS effective, efficient, and responsive to the Army's needs.
GRA

N80-12962# SRI International Corp., Menlo Park, Calif. Artificial Intelligence Center.
MECHANICAL INTELLIGENCE: RESEARCH AND APPLICATIONS Final Report, 1 Oct. 1977 - 30 Sep. 1978
Robert C. Moore Aug. 1979 104 p refs
(Contract N00039-78-C-0060; ARPA Order 3175)
(AD-A073127) Avail: NTIS HC A06/MF A01 CSCL 09/2

Section I of this report gives some background information on the LADDER system, outlines the changes made to the architecture of the system, and briefly explains the enhanced capabilities produced by those changes. Section II discusses user experiences with the first-generation LADDER system and the response of SRI to the reports of those experiences. Section III describes new user features that have been added to LADDER. Section IV discusses SODA, an improved data access system for LADDER, explaining its new capabilities and the problems of supporting those capabilities in accessing distributed data. Section V describes how the system has been extended to access a heterogeneous data base consisting of both Datacomputer and DBMS-20 data base management systems. Section VI reports on progress to date in bringing the results of our longer-term research into the LADDER system, in the form of a new natural-language processor that will permit a greater range of natural-language questions and lay the groundwork for transporting the system to new data bases and new domains. Section VII lists the publications and presentations by the project staff during the period covered by this report. Finally, Appendix A gives more detail on the new formal query language for data access, and Appendix B describes an experimental French-language version of LADDER. GRA

N80-14965# Massachusetts Inst. of Tech., Cambridge. Center for Information Systems Research.
THE IMS DATA STORAGE HIERARCHY: DSH-1
Chat-Yu Lam and Stuart E. Madnick Aug. 1979 44 p refs
(Grant N00039-78-G-0160)
(AD-A073375; CISR-M010-7908-02; CISR-TR-2) Avail: NTIS HC A03/MF A01 CSCL 09/2

To achieve high performance, large capacity, and high availability, the IMS data base computer takes the approach of implementing the logical information management functions by means of a pipeline of parallel microprocessors and makes use of a storage hierarchy with distributed control for the physical storage and manipulation of very large databases. The data storage hierarchy (DSH) of IMS provides a very large byte addressable virtual address space accessible by the large number of processors that implement the logical information management functions of IMS. A highly parallel structure is used by the DSH to support asynchronous processing of a large number of data requests in order to attain very high throughput. Use of multiple block sizes across the storage levels and use of efficient data movement algorithms contribute to the high performance of DSH. The use of distributed control as well as multiple data redundancy gives DSH the capability to tolerate hardware failures without suffering data loss or availability of service. This report describes the design objectives and the structure of a general data storage hierarchy (DSH-1). Research issues in DSH-1 are also discussed. GRA

N80-14966# Massachusetts Inst. of Tech., Cambridge. Center for Information Systems Research.
THE IMS DATA STORAGE HIERARCHY: DSH-2
Chat-Yu Lam and Stuart E. Madnick Aug. 1979 53 p refs
(Grant N00039-78-G-0160)
(AD-A073376; CISR-M010-7908-03; CISR-TR-3) Avail: NTIS HC A04/MF A01 CSCL 09/2

The need for efficient storage and processing of very large data bases coupled with advances in Large Scale Integration (LSI) technology have motivated various proposals to develop specialized computers for data base processing. The IMS data base computer (DBC) approach to this problem is to implement the logical functions of a data base management system by means of a hierarchy of microprocessors and to use a data storage hierarchy for efficient storage and retrieval of very large data bases. GRA

N80-15982# Planning Research Corp., McLean, Va.
INVERTED FILE FACILITY: USER'S GUIDE Final Report
S. Tamberrino 31 Aug. 1977 97 p
(Contract DCA100-73-C-0015)
(AD-A074081; PRC-706-22) Avail: NTIS HC A05/MF A01 CSCL 05/2

The Inverted File Facility (INVFF) is an extension of the Indexed Sequential Processor (ISP) which allows the user to build, retrieve from, and update inverted data bases. In addition to the ISP's data file and index file, the INVFF uses an inverted index file which provides the following additional file processing capabilities: (1) the ability to distinguish each data record as being a specific type and (2) the ability to process data records randomly through the specification of values contained within a record. GRA

N80-15983# Army Missile Research and Development Command, Redstone Arsenal, Ala. Technology Lab.
AERODYNAMIC DATA BASE USERS GUIDE
George M. Landingham 5 Jun. 1979 27 p
(AD-A074448; DRDMI-T-79-62) Avail: NTIS HC A03/MF A01 CSCL 05/2

A data base system has been developed for storage and interactive analysis of data. This report is intended as a description of the system and as a user's guide. The equipment on which the data base system is implemented is detailed. A description of the data base structure and detailed instructions for using the system are included. GRA

N80-15985# Stanford Univ., Calif. Dept. of Computer Science.
A STRUCTURAL MODEL FOR DATABASE SYSTEMS
Gio Wiederhold and Ramez El-Masri Feb. 1979 59 p refs
(Contract MDA903-77-C-0322)
(AD-A074077; SU-STAN-CS-79-722) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report presents a model to be used for database design. Because our motivation extends to providing guidance for the structured implementation of a database, we call our model the Structural Model. We derive the design using criteria of correctness, relevance, and performance from semantic and operational specifications obtained from multiple sources. These sources typically correspond to prospective users or user groups of the database. The integration of such specifications is a central issue in the development of an integrated structural database model. The structural model is used for the design of the logical structures that represent a real-world situation. However, it is not meant to represent all possible real-world semantics, but a subset of the semantics which are important in database modeling. GRA

N80-15986# Ford Aerospace and Communications Corp., Palo Alto, Calif.
PRELIMINARY DESIGN OF A NETWORK VIRTUAL DATA BASE SYSTEM Final Report
Griffiss AFB, N.Y. RADC Aug. 1979 151 p refs
(Contract F30602-77-C-0158; AF Proj. 0173)
(AD-A074205; RADC-TR-79-102) Avail: NTIS HC A08/MF A01 CSCL 09/2

Development of the Network Virtual Data Base System (NVDBS) and the Adaptive User Interface (AUI) address several needs of DOD intelligence systems. The NVDBS could provide a bridge between different data base management systems (DMBSs) on different host computers (nodes) linked through a network, without being required to know how to access each DBMS directly. The network level description of the information and its logical structures would be interactively available to the casual user. The informed user could then 'navigate' through the Network Data Model (NDM). Further, the analyst could discover and link correlated data, for the NVDBS will support 'virtual linkages' between records physically located on different DBMSs of the NVDBS network. For a DBMS to be accessible on the NVDBS network, it must be on a node of the network, and must be linked to the NVDBS through an interface tailored to the idiosyncrasies of the particular DBMS and node. The NVDBS will behave as an ordinary user of each DBMS on the network. The NVDBS also will support the creation of 'virtual linkages' between record instances physically located on different hosts. This report overviews the preliminary design study. GRA

N80-15987# Stanford Univ., Calif. Dept. of Computer Science.
INDUCTION OVER LARGE DATA BASES
J. R. Quinlan May 1979 21 p refs
(Contract MDA903-77-C-0322)
(AD-A074075; SU-STAN-CS-79-739; HPP-79-14) Avail: NTIS HC A02/MF A01 CSCL 09/2

Techniques for discovering rules by induction from large collections of instances are developed. These are based on an iterative scheme for dividing the instances into two sets, only one of which needs to be randomly accessible. These techniques have made it possible to discover complex rules from data bases containing many thousand of instances. Results of several experiments using them are reported. GRA

N80-16999# QEI, Inc., Bedford, Mass.
INFORMATION MANAGEMENT PROBLEMS RELATING TO NUMERIC DATA BASE SERVICES FOR DOE Interim Report for Phase 2 of QEI Proj. 4181
J. W. Kuipers and R. W. Thorpe 13 Apr. 1979 51 p refs
(Contract EV-78-C-01-6182)
(DOE/TIC-10144; QEI-Report-9413) Avail: NTIS HC A03/MF A01

Problems of numeric data are examined as these relate to the question of possible steps toward implementation of an integrated national information system. It is proposed that policy and organization changes be made in order to centralize and upgrade information management. Eight points to be emphasized in such a program are set forth. DOE

N80-17903 Indiana Univ., Bloomington.
A MATHEMATICAL MODEL TO EVALUATE THE EFFECTS ON RETRIEVAL TIMES OF ALTERNATE STRUCTURES FOR LIBRARY DATABASE DESIGN Ph.D. Thesis
Karen Andrea Momenee 1979 273 p
Avail: Univ. Microfilms Order No. 8000709

A model is developed to aid in choosing the most efficient data structures for library databases. The model consists of two parts: an information model which can be totally divorced from the machine implementation and enables the designer to describe the contents of the database and query stream in set theoretic terms; and a retrieval model which simulates the operation of the database and measures retrieval time for various structural configurations and query forms in terms of seeks (or access movements) and rotations of the disk. Assumptions in previous models of a uniform distribution of attribute-values are replaced with bibliometric distributions based on author productivity and the frequency of occurrence of words in natural language. These distributions are used to generate the queries and as a statistical sketch to describe the probable contents of the database.
Dissert. Abstr.

N80-17905*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AOIPS DATA RETRIEVAL SYSTEM (DRS) SUPPORT FOR GARP SEA ICE AND RAIN RATE DATA SETS
K. W. Posey Nov. 1978 38 p
(NASA-TM-79686) Avail: NTIS HC A03/MF A01 CSCL 05B

The functional capabilities which are incorporated into the Goddard Space Flight Center Atmospheric and Oceanographic Information Processing System (AOIPS) Data Retrieval System (DRS) are identified. These capabilities provide access to sea ice concentration and ocean rainfall rate data sets produced from the Nimbus-5 and Nimbus-6 Electrically Scanning Microwave Radiometer brightness temperature measurements for the Global Atmospheric Research Program Project during its Data Systems Tests. This support consists of four basic functions: (1) an inventory capability which provides a description of the contents of each tape resident sea ice and rain rate data set; (2) a selective tape to tape copy capability which allows for the creation of a subset data tape containing only those data sets of interest; (3) a data set selection capability whereby the contents of a specific data set can be displayed or printed or transferred to disk for further processing; and (4) an image display capability which allows for specified data sets to be transformed into a digital image format for subsequent display and analysis on the AOIPS image analysis terminals. J.M.S.

N80-17906# Massachusetts Inst. of Tech., Cambridge. Center for Information Systems Research.
THE INTELLIGENT MEMORY SYSTEM ARCHITECTURE RESEARCH DIRECTIONS
Chat-Yu Lam and Stuart E. Madnick Aug. 1979 48 p refs
(Grant N00039-78-G-0160)
(AD-A073485; CISR-M010-7908-01; CISR-TR-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

Information storage, retrieval, communication, and processing have become increasingly important for modern command and control systems. Conventional computers are primarily designed for computational purposes and are not well-suited for information management. This report introduces the concepts and research directions of the Intelligent Memory System (IMS), which is particularly designed for large-scale information management to support future command and control systems. Author (GRA)

N80-18001 University of Southwestern Louisiana, Lafayette.
THE DESIGN AND IMPLEMENTATION OF A RELATIONAL AND NETWORK DATABASE ACCESS LANGUAGE Ph.D. Thesis
Donald Jules Simon 1979 146 p
Avail: Univ. Microfilms Order No. 8002716

A mapping oriented query language is described which can interface with either a relational or network data base. An extended query language utilizes the relational calculus and a CODASYL-type data manipulation language as target languages to map the user's query into the respective data model. The user need not know which relations or records contain which attributes; the user merely provides XQL with (1) the attributes or fields he wants retrieved, and (2) the conditions under which they are to be retrieved. Also, XGL provides the user with functions such as SORT, COUNT, AVERAGE, MIN, and MAX, and provides the users of both relational and network models with a straightforward method of interfacing with either model. Furthermore it allows the users of a network model to view the data in a tubular representation as users of the relational model do.Dissert. Abstr.

N80-18003 Florida Univ., Gainesville.
A SYSTEMATIC APPROACH TO LOGICAL DATABASE DESIGN Ph.D. Thesis
Der-Her Lo 1979 188 p
Avail: Univ. Microfilms Order No. 8002873

A step-by-step design process is presented which can guide the database designs to carry out the logical database designs systematically so that high quality databases can be obtained and the designer productivity can be increased. Topics covered include requirement analysis and specification, application modeling, application integration, DBMS schema generation, and query skeleton generation. A prototype of the computer-assisted logical database design and based on the described design process is implemented. Dissert. Abstr.

N80-18004 Princeton Univ., N. J.
DATA DEPENDENCIES IN RELATIONAL DATABASE SCHEMES Ph.D. Thesis
Alberto Oscar Mendelzon 1979 78 p
Avail: Univ. Microfilms Order No. 8003792

The tableau method for representing and manipulating database schemes is used for developing an algorithm to determine whether a given join dependency is a logical consequences of a set of functional, multivalued and join dependencies. A notion of equivalence of database schemes is introduced, based on the equality of the fixed-point sets of the associated project-join mappings. It is shown that the implication testing method can be applied to the determination of whether two database schemes are equivalent under a set of functional and join dependencies. Finally, the notion of lossless decompositions and fixed-points of a database scheme is examined by introducing generalized mutual dependencies. It is shown that generalized mutual dependencies are equivalent to a special type of join dependencies, and furthermore, any join dependency is equivalent to a generalized mutual dependency plus a set of multivalued dependencies.
Dissert. Abstr.

N80-18007# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
ON DATABASE MANAGEMENT SYSTEM ARCHITECTURE Interim Report
Michael Hammer and Dennis McLeod Oct. 1979 43 p refs
Prepared in cooperation with the Univ. of Southern California, Los Angeles
(Contract N00014-76-C-0944)
(AD-A076417; MIT/LCS/TM-141) Avail: NTIS HC A03/MF A01 CSCL 05/2

Despite the many advances that have been made in the field of database management in the last two decades, in many respects the paradigm of database management has not changed much since its inception. Several long-standing assumptions pervade the field and exert a great influence on the architecture of database management systems, their functions, and the kinds of databases that they manage. This paper reconsiders some of these assumptions and suggests certain alternatives to them. In particular, it is argued that the concept of an integrated database ought to be supplanted by that of a federated database, a loose assembly of semi-independent components; the position of the database management system in the context of a total information system is reexamined, and arguments are made for extending its functional capabilities; and controlled logical redundancy in the schema is introduced as a means of improving the usability of a database and of enhancing its life-cycle performance. GRA

N80-19982*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE SPACE SCIENCE DATA SERVICE: A STUDY OF ITS EFFICIENCIES AND COSTS
James I. Vette, Robert H. Hilberg, Donald E. Zuhl, and Albert E. West Dec. 1979 58 p refs
(NASA-TM-80760; NSSDC-79-09) Avail: NTIS HC A04/MF A01 CSCL 05B

Factors affecting the overall advantages and disadvantages of a centralized facility for both the data base and processing capability for NASA's Office of Space Science programs are examined in an effort to determine the best approach to data management in the light of the increasing number of data bits collected annually. Selected issues considered relate to software and storage savings, security precautions, and the phase-in plan. Information on the current mode of processing and on the potential impact of changes resulting from a conversion to a space science data base service was obtained from five user groups and is presented as an aid in determining the dollar benefits and advantages of a centralized system. A.R.H.

N80-19994# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
SERIALIZABILITY OF CONCURRENT DATABASE UPDATES
Christos H. Papadimitriou Mar. 1979 64 p refs
(Contract N00014-75-C-0661; Grants NSF MCS-77-01193; NSF MCS-77-05314)
(AD-A078414; MIT/LCS/TR-210) Avail: NTIS HC A04/MF A01 CSCL 05/2

A sequence of interleaved user transactions in a database system may not be serializable, i.e., equivalent to some sequential execution of the individual transactions. Using a simple transaction model we show that recognizing the transaction histories which are serializable is an NP-complete problem. We therefore introduce several efficiently recognizable subclasses of the class of serializable histories; most of these subclasses correspond to serializability principles existing in the literature and used in practice. We also propose two new principles which subsume all previously known ones. We give necessary and sufficient conditions for a class of histories to be the output of an efficient history scheduler; these conditions imply that there can be no efficient scheduler that outputs all of serializable histories, and also that all subclasses of serializable histories studied above have an efficient scheduler. Finally, we show how our results can be extended to far more general transaction models, to transactions with partly interpreted functions, and to distributed database systems. GRA

N80-19998# Harvard Univ., Cambridge, Mass. Div. of Applied Sciences.
ON OPTIMIZATION OF QUERY PROCESSING STRATEGIES Interim Report
D. M. Chiu, Y. C. Ho, and P. A. Bernstein Oct. 1979 59 p refs
(Contract N00014-75-C-0648; Grant NSF ENG-78-15231)
(AD-A078470; TR-672) Avail: NTIS HC A04/MF A01 CSCL 05/2

This report examines the formulation of the query processing problem as an optimization problem. The real problem, which involves database states as parameters, is an intractable one. The problem can, however, be transformed into equivalent and simplified versions by making certain assumptions. In order to state these assumptions and the problem transformation on a formal basis, the notion of characterization is introduced. A characterization is a mapping of the database state space into a simplified parameter space. Meaningful simplification of the original problem is possible only when suitable characterizations can be found. The problem formulations in several important papers are reviewed and a detailed example is represented to illustrate some ideas. GRA

N80-21191# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences.
DESCRIPTION OF THE WHARTON/ODA SYSTEM
David Oppenheim, ed., James S. Ribeiro, ed., and E. Gerald Hurst, Jr., ed. Dec. 1979 22 p refs
(Contract N00014-75-C-0440)
(AD-A079601; Rept-79-12-02) Avail: NTIS HC A02/MF A01 CSCL 05/2

The purpose of this document is to give a brief introduction to the hardware available in the Wharton Computer Center and the Decision Aiding Systems Laboratory (DASL), and to summarize the software which has been developed at Wharton under the Operational Decision Aiding Project. More detail about most of these features is available; in particular, some of the other software developed for use on the Wharton system may be of interest to other contractors, now that the system is easily accessible via the ARPANET. GRA

N80-21192# Pattern Analysis and Recognition Corp., Rome, N. Y.
ADVANCED QUERY TECHNIQUES Final Report, 19 Sep. 1977 - 19 Jun. 1979
C. P. Mah and John M. Morris Oct. 1979 182 p refs
(Contract F30602-77-C-0161; AF Proj. 4594)
(AD-A079626; RADC-TR-79-260) Avail: NTIS HC A09/MF A01 CSCL 05/2

The report describes an RADC sponsored R D effort directed at providing an improved natural language access to differently formatted target databases. Section I defines functional characteristics of on-line intelligence information systems within the current state-of-the-art; describes the rationale of the AQT effort, and provides a comparison between the AQT approach and other approaches inherent in the existing information systems with a practical orientation. Section 2 describes basic concepts of the AQT approach (extended relational data models, intermediate query language, table driven translation). Linguistic implementation of natural language query techniques is provided in Section 3. Section 4 deals with the methodology of accessing differently formatted target databases. Section 5 describes some special problems in querying target databases (e.g., generic keys, ellipsis, purging a context, conversational postulates). Section 6 constitutes a detailed description of the presently available AQT testbed system. Section 7 provides criteria for evaluation of user interface languages for database management systems. Section 8 is a statement of conclusions including present status and results; operational evaluation criteria; areas for further work, plans, summary and directions. GRA

N80-23199 Michigan Univ., Ann Arbor.
ABSTRACT DATA STRUCTURES AND QUERIES: TOWARD MATHEMATICAL ANALYSIS IN LOGICAL-LEVEL DATABASE DESIGN Ph.D. Thesis
Donald Eugene Swartwout 1979 271 p
Avail: Univ. Microfilms Order No. 8007845

A mathematical theory is presented which is based in large part on the premise that bodies of data are broken down into pieces for storage on electronic media and then reassembled in order to construct response to users' requests for retrieval of data. An axiomatic characterization of this reassembly operation is given and an abstract data structure (ads) is defined to be any set equipped with a binary operation which satisfies the axioms. Three aspects of adses are investigated in detail: their algebraic properties, their relationship to real-world data manage-

ment, and their role in the definition and analysis of data retrieval operations. Organizations for adses are used in the study of data retrieval operations. The language of the first-order predicate calculus is used to construct definitions for queries to organized adses. Query definitions are classified into a hierarchy patterned after the arithmetical hierarchy of ordinary recursion theory.
Dissert. Abstr.

N80-23201 Michigan Univ., Ann Arbor.
DESIGN OF DBMS-PROCESSABLE LOGICAL DATABASE STRUCTURES Ph.D. Thesis
Subir Purkayastha 1979 331 p
Avail: Univ. Microfilms Order No. 8007814

A computer-aided design tool for the logical data base structure design process is developed. The inputs to the methodology are a set of data items and a set of associations or relationships between pairs of data items. Other input include the volume of data items (number of occurrences of each data item type), data item access frequencies to satisfy known processing requirements, constraints for security and storage space considerations, and relevant characteristics of a specific data base management system (DBMS). The output of the methodology is a prototype DBMS-processable logical data base structure (schema) consisting of record definitions and relationships between record types storage, and access costs for the proposed logical data base structure. The design problem is formulated as an integral programming problem and the branch and bound method is used to generate an optimum solution for the parameters specified.
Dissert. Abstr.

N80-23202 Michigan Univ., Ann Arbor.
PHYSICAL DESIGN OF DATABASE STRUCTURES Ph.D. Thesis
Lewis Benjamin Oberlander 1979 336 p
Avail: Univ. Microfilms Order No. 8007795

The physical data base structure design problem is analyzed as a collection of sub-problems, each of which is separately modeled and solved by appropriate techniques. The CODASYL data model is assumed. The input to the physical design process is a logical data base structure (essentially a Bachman Diagram) and data volume and access statistics. Technqiues are proposed for the record placement problem, the SET design problem, and the area design problem. Each design technique proposed requires as input results from the application of several of the other techniques, leading to circular dependencies among the techniques. An iterative scheme for integrating the technqiues is proposed. The operation of this integration scheme and the individual techniques are illustrated by an example.
Dissert. Abstr.

N80-23203 Michigan Univ., Ann Arbor.
TOWARDS A THEORY FOR BEHAVIOR STUDIES OF DATA STRUCTURES Ph.D. Thesis
Siroos Afshar-Khajevand 1979 204 p
Avail: Univ. Microfilms Order No. 8007700

In order to identify those general structures which correspond to data structures, five restrictive axioms are presented, discussed, and justified. Three axioms are to be satisfied by dynamic parts, one 'axiom is to be satisfied by both dynamic and static parts, and one axiom is to be satisfied by the dynamic and the static parts considered as pairs. Dynamic and static parts are studied both as abstract mathematical objects and as parts of real life data structures. Several notions are defined and their real life counterparts and/or interpretations are given. Applications of the theory are presented and discussed. Examples are given as to how to employ the theory in studies concerning the power of data structures, the behavioral optimization of data structures, and the specification of abstract data structures. Dissert. Abstr.

N80-23204 Northwestern Univ., Evanston, Ill.
A SIMULATION STUDY OF ATTRIBUTE BASED LOCKING MECHANISMS FOR RELATIONAL DATABASES Ph.D. Thesis
Charles Coryell Devor 1979 149 p
Avail: Univ. Microfilms Order No. 8008158

A locking mechanism for relational databases wherein lockable resources are defined as a static two level hierarchy of database attributes and instances is proposed. In addition to this definition of resources, the concept of subset mode access is defined as an efficient vehicle for protection from phantom tuples. In this environment three separate attribute concurrency levels are definable. Each level defines more potential concurrency in exchange for more system overhead for locking. The concurrency levels are defined in terms of access to a single database attribute. To investigate the possibility of realizing such improvements in a real environment, discrete event simulation modeling is used. Studies were conducted on the performance of the three attribute concurrency levels, for different user environments.
Dissert. Abstr.

N80-23205 Illinois Univ. at Urbana-Champaign.
A METHODOLOGY FOR MACHINE REPRESENTATION OF MEDICAL KNOWLEDGE Ph.D. Thesis
Arthur Bayard Baskin, III 1979 144 p
Avail: Univ. Microfilms Order No. 8008969

A formalism for the construction of knowledge bases is presented, and some of the advantages of using a knowledge base interactively during its own construction are explored. The formalism is used to evolve a metric for knowledge which measures the quality of access to information. In addition, a system of computer programs for the interactive acquisition of medical knowledge (MEDIKAS) is described. The preliminary use of the MEDIKAS system was to represent and enforce a model of gneeral knowledge base before any medical knowledge is added. The resulting meta-knowledge provides the acquisition portions of MEDIKAS with a certain amount of self-awareness. The nature of the meta-knowledge and the results of preliminary medical knowledge input are described. Dissert. Abstr.

N80-23206 Ohio State Univ., Columbus.
A METHODOLOGY FOR THE DEFINITION OF DATA BASE WORKLOADS: AN EXTENSION TO THE IPSS METHODOLOGY Ph.D. Thesis
Patrick Man-Kwong Wong 1979 281 p
Avail: Univ. Microfilms Order No. 8008797

A methodology for characterizing the data base workload for performance accessament purpose was developed. Procedures were developed for characterizing the distribution of data base attributes within the information system's data base in an implementation independent manner, and the structure of the user generated queries which constitute the system's input workload. An algorithm transforms the general prepositional based user query into one or more normalized Boolean expressions. The second algorithm transforms the Boolean expressions into data base responses. Discrete event simulation constructs were developed based on methodological model and were incorporated into the Information Processing System Simulator's Modeling and Executional Facilities. The IPSS language extensions were implemented, tested, and verified. It was found that the methodology is applicable to both conventional information storage and retrieval systems and relational data base management systems.
Dissert. Abstr.

N80-23208# European Space Agency, Frascati (Italy).
THE INFORMATION RETRIEVAL SERVICE OF THE EUROPEAN SPACE AGENCY
Dec. 1979 12 p
Avail: NTIS HC A02/MF A01

The on-line retrieval system and specialized off-line services for the bibliographic data bases and factual data banks are described. Subscription information for European users is given.
Author (ESA)

N80-24207# Pennsylvania Univ., Philadelphia. Moore School of Electrical Engineering.
SYSTEM REQUIREMENTS ANALYSIS FOR THE CHEMICAL STRUCTURE AND NOMENCLATURE SYSTEM (CSNS) Final Report
David Lefkovitz, Helen N. Hill, and Carol S. Kulp 28 Sep. 1979 234 p refs
(PB80-105216) Avail: NTIS HC A11/MF A01 CSCL 05B

The Chemical Structure and Nomenclature System (CSNS) which will enable Chemical Substances Information Network

(CSIN) users to determine whether a particular chemical substance exists in the network is presented. A plan for CSNS development, including functional and operational requirements, design alternatives, existing systems, and a developmental approach, is presented. GRA

N80-24208# Hotline International, New York, N.Y.
HOW TO GAIN ACCESS TO INFORMATION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT FROM DATA BASES VIA COMPUTER TELECOMMUNICATIONS
Glen Leet Aug. 1979 47 p refs Presented at the UN Conf. on Sci. and Technol. for Develop., Vienna, Aug. 1979
(PB80-133143) Avail: NTIS HC A03/MF A01 CSCL 05B

The use of computers and the telecommunications systems to improve access to information in developing countries are considered. Computer access to data banks is demonstrated. A plan for practical demonstrations of the transfer of information on Science and Technology for development via computer telecommunications is given. The augmentation of international conferences through computer communications is discussed. GRA

N80-25202# California Univ., Berkeley. Electronics Research Lab.
INGRES: A RELATIONAL DATA BASE SYSTEM Final Report, 1 Jun. 1976 - 30 Sep. 1979
M. Stonebraker and E. Wong Sep. 1979 10 p refs
(Grant DAAG29-76-G-0245)
(AD-A082548; ARO-13585.14-EL) Avail: NTIS HC A02/MF A01 CSCL 05/2

The report summarizes the progress made during a three year period on research in data base management. The primary effort has been the design development of a major data base management system of the relational type, INGRES. In addition, a number of new directions, such as distributed data bases and data base machines were initiated. GRA

N80-25206# Royal Aircraft Establishment, Farnborough (England).
ACCEPTANCE TESTS FOR THE RAE SCIENTIFIC DATA BASE: THE SCHEMA AND SUBSCHEMA COMPILER TESTS
Irene M. Cummings London HMSO Aug. 1979 27 p refs
(RAE-TM-Math-Comp-7905; BR71383) Avail: NTIS HC A03/MF A01

A data base management system was designed consisting of a set of utility programs and a library of routines which can be incorporated in FORTRAN programs. The system was subjected to a set of rigorous acceptance tests. One set of acceptance tests, prepared for the schema and subschema compilers, are described in detail. These tests are shown to be sufficient to ensure confidence in the soundness of the software. Author (ESA)

N80-26194# Illinois Univ. at Urbana-Champaign. Coordinated Science Lab.
BROWSING IN LARGE DATA BASES
Douglas D. Dankel, II Feb. 1979 25 p refs
(Contract N00014-75-C-0612)
(AD-A081987; WP-17) Avail: NTIS HC A02/MF A01 CSCL 09/2

The formation of data bases containing information on mechanical systems for trouble shooting purposes has become increasingly popular and important. Examination of these data bases by humans can be very costly. A system called BROWSER is currently under development to heuristically search a data base containing information on Navy aircraft with little or no human intervention. BROWSER searches the data base guided by models and heuristics looking for interesting patterns or configurations. The user is then notified of the existence of these patterns. GRA

N80-27210# Calculon Corp., Philadelphia, Pa.
DISTRIBUTED DATA BASE TECHNOLOGY STATE-OF-THE-ART REVIEW Final Technical Report, Mar. 1979 - Sep. 1979
Griffiss AFB, N.Y. RADC Feb. 1980 80 p refs
(Contract F30602-78-C-0113; AF Proj. 4594)
(AD-A082037; RADC-TR-80-7) Avail: NTIS HC A05/MF A01 CSCL 09/2

This document provides theoretical information relating to the development of information systems where large data bases are utilized. The study considers the problems associated with the construction, implementation and maintenance of those data bases in a distributed processing environment. The data base management systems, data communications networking and the utilization of multi-processor configurations are also included in the investigation. Four specific problem areas of the update function under the distributed concept were studied and are reported upon. They are data integrity, logging and recovery, deadlock and security. GRA

N80-28231 California Univ., Los Angeles.
APPLYING BEHAVIORAL ABSTRACTION TO INFORMATION SYSTEM DESIGN AND INTEGRITY Ph.D. Thesis
Nancy Gail Leveson 1980 152 p
Avail: Univ. Microfilms Order No. 8016007

The practicality and usefulness of defining information systems using behavioral abstraction is explored. The meaning or semantics of the data is defined in the manner of an abstract data type, that is, by the definition of the operations on objects. Preserving the integrity, or correctness, of an object is defined preserving its abstract invariant. Thus specifying integrity involves both specifying the abstract invariant (the static characteristics) and the legal operations specified by pre and post conditions (the behavioral characteristics) which preserve this invariant. A method for verifying the integrity specification of an information system by proving that the abstract operations preserve the invariant and a practical means for enforcing integrity lead naturally from the integrity specification technique. It can be proved that the implementations of the operations are correct with respect to the abstraction, inserting assertions into the implementations when necessary for run-time checking. A well-structured, disciplined methodology, for information system design which supports the use of such techniques as top-down design, information hiding, and code sharing is presented along with the formal specification method. Dissert. Abstr.

N80-28232 California Univ., Los Angeles.
SECURITY IN DATA BASE MANAGEMENT SYSTEMS Ph.D. Thesis
Deborah Downs 1980 229 p
Avail: Univ. Microfilms Order No. 8015964

Several proposed methods of supplying security in data base management systems (DBMS) are examined and conclusions are drawn concerning their suitability. A design for a certifiable, value independent, data secure, DBMS kernel is described. The DBMS kernel supports data security by identifying the data correctly at the domain level and providing a certifiable direct mapping from the logical name of the data (used in the protection data and the user's request) to the physical identity (used at the access method level). Using this basic kernel design a retrofit of the DBMS kernel was developed for Ingres, a relational DBMS. Also included is an abstract model for value independent, data secure DBMSs which can be used as a basis for certifying a DBMS kernel. In order to support the secure DBMS a data secure operating system is needed which allows only the DBMS read access to the data base and the DBMS kernel read and write access. Access to the data base by other processes is prohibited. The data secure operating system must also supply a secure process environment to the DBMS kernel. A correct operating system is needed in order to retrieve exactly the data requested by the DBMS kernel and also only certified operating system code can be included in the DBMS kernel's process space. Dissert. Abstr.

N80-28233 California Univ., Berkeley.
EVALUATION AND ENHANCEMENT OF THE PERFORMANCE OF RELATIONAL DATABASE MANAGEMENT SYSTEMS Ph.D. Thesis
Paula Birdwell Hawthorn 1979 213 p
Avail: Univ. Microfilms Order No. 8014726

In order to determine the performance characteristics of a standard data base system, the performance of the relational data management system INGRES in analyzed. A benchmark analysis technique is used for the performance evaluation. The results show that the performance characteristics of two query types: data-intensive queries and overhead-intensive quries, are so different that it may be difficult to design a single architecture to optimize the performance of both types. Significant sequentially of reference was found in the data-intensive queries. It is shown that back-end data management machines may be cost effective only for data-intensive queries. It is proposed that the best method of distributing the processing of the overhead-intensive query is through the use of intelligent terminals. It is shown that there is significant locality of reference in the multi relation queries. The performance of the INGRES system is compared to estimated performance of serveral database machines. It is found that for significant classes of quories and standard system provides the most cost-effective processing of the queries. Dissert. Abstr.

N80-28234 Washington Univ., Seattle.
ACCESS PATH OPTIMIZATION IN MULTIDIMENSIONALLY ACCESSED DATABASE FILES Ph.D. Thesis
Georges Spiridon Nicolas 1979 153 p
Avail: Univ. Microfilms Order No. 8012200

A general access path model for multidimensionally accessed data base fields is developed. This model is capable of characterizing a large class of file organizations. Three principal access path structures are identified and then used to model a general file organization. This organization supports the multidimensional key access feature and includes all the basic file organizations as special cases. A cost function based on both storage and time costs is developed. This cost function quantitatively measures the performance of the data base system and can also be used to evaluate the efficiencv of the various classical file organizations. Optimization techniques which minimize the cost function by producing an optimal design based on the file organization are developed. The general cost problem is first transformed into a set of three simpler cost problems through a series of decomposition and reduction steps. These simpler cost problems are defined as linear integer programming (LIP) models with binary valued variables. Dissert. Abstr.

N80-28237# Battelle Columbus Labs., Ohio.
MECHANICAL PROPERTIES DATA CENTER Annual Report, 1 Jan. - 31 Dec. 1979
Harold Mindlin, Harold Hucek, and Ross Gubiotti Mar. 1980 60 p
(Contract DLA900-79-C-0539)
(AD-A083123; AMMRC-TR-80-8) Avail: NTIS HC A04/MF A01 CSCL 05/2

This report summarizes MPDC activities for the period 1 January 1979 through 31 December 1979, a total of 12 months, under Contract DLA900-79-C-0539. It provides a summary of the scope, objectives and organization of MPDC, its information processing products, and services, and a discussion of management objectives. The report focuses on the start up of MPDC and the conversion of the mechanical properties data base to the Battelle data base management system engendered by the change of contractors. GRA

N80-29206# Battelle Columbus Labs., Ohio Tactical Technology Center.
EVALUATION OF DATA MANAGEMENT FOR INSTALLATION RESTORATION Final Report, Jun. 1977 - Feb. 1978
T. J. Thomas and G. J. Kovacs 28 Feb. 1978 53 p refs
(Contract DAAK40-73-C-0142)
(AD-A084777; BATT-CDIR-1-1; DRXTH-TD-CR-80067) Avail: NTIS HC A04/MF A01 CSCL 09/2

An external evaluation of the Data Management Program for the Operations of the Installation Restoration program is presented. Specific recommendations are made for the improvement of the Data Management Program. These recommendations cover management of the data log books, extra data fields to input error estimates, data, and free-form comments, system input stability, and required data sampling plans. In addition, a review of contaminant models is presented. Finally, a weakness in the quality control is presented, and a management information system is discussed. GRA

N80-30221 Michigan Univ., Ann Arbor.
A COMBINED COMMUNICATION NETWORK DESIGN AND FILE ALLOCATION FOR DISTRIBUTED DATABASES Ph.D. Thesis
Nicholas George Khabbaz 1980 160 p
Avail: Univ. Microfilms Order No. 8017291

The combined problem of communication network design and file allocation for distributed databases is addressed. The network topologies are restricted to be maximally connected and of minimal diameter. A model is proposed to find an optimal communication network and allocation of files that minimize the total cost of file storage and of the communication channels. The model takes into consideration network reliability, file availability, and communication delay constraints. It was shown that the network reliability constraint puts a lower bound, kappa sub m, on the network connectivity kappa, the file availability constraints put lower bounds on the number of copies of each file, and the delay constraints put lower bonds on the channel capacities. A heuristic algorithm to solve the model is then described and some results are presented. The results show that, in some cases, the optimal solution is obtained when kappa = kappa sub m. In other cases, however, increasing kappa results in the reduction of the total cost, and the improvement of both the network reliability and the file availability. Dissert. Abstr.

N80-31286# Sandia Labs., Albuquerque, N. Mex. Computer Aids Systems Development.
INVESTIGATION INTO INTERACTIVE GRAPHICS DATA BASE EXCHANGE VIA GERBER DATA
Robert E. Parks Mar. 1980 18 p
(Contract EY-76-C-04-0789)
(SAND-80-0588) Avail: NTIS HC A02/MF A01

The use of the Gerber language as a common data form through which design data could be exchanged between unlike systems is examined. Applicon Graphic System was used cyclically to check retention or degeneration of the data integrity when the original design was extracted/defined in the Gerber language and reentered into the AGS utilizing various Gerber interface Programs. Even though plots of the files appear very similar, the individual data bases are very dissimilar. Programs, both present and future, that might supply needed information or design aids and characteristics would find it virtually impossible to do so from a data base lacking the sophistication and completeness of the original AGS data base. Man machine hours required to bring the data base back to original quality would be extensive. The loss of data base integrity shown by this study was restricted to an AGS to AGS transfer. The loss could very easily be magnified if the transfer were between unlike systems. DOE

N80-32280# National Technical Information Service, Springfield, Va.
DISTRIBUTED DATA PROCESSING. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - May 1980
Brian Carrigan Jun. 1980 171 p Supersedes NTIS/PS-79/0710; NTIS/PS-78/0671
(PB80-812217; NTIS/PS-79/0710; NTIS/PS-78/0671) Avail: NTIS HC $30.00/MF $30.00 CSCL 09B

The bibliography of Federally-funded research cites studies on the concepts, design, development, implementation, and application of distributed data processing. Also included are studies on distributed data bases. General communication studies related to major computer networks are cited in another bibliography. This update bibliography contains 184 abstracts, 37 of which are new entries to the previous edition. GRA

N80-32281# National Technical Information Service, Springfield, Va.
DISTRIBUTED DATA PROCESSING. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, Jul. 1979 - May 1980

Brian Carrigan Jun. 1980 242 p Supersedes NTIS/PS-79/0711; NTIS/PS-78/0672
(PB80-812225; NTIS/PS-79/0711; NTIS/PS-78/0672) Avail: NTIS HC $30.00/MF $30.00 CSCL 09B

The bibliography of worldwide journal literature cites studies on the concepts, design, development, implementation, and application of distributed data processing. Also included are studies on distributed data bases. General communication studies related to major computer networks are cited in another bibliography. This updated bibliography contains 231 abstracts, all of which are new entries to the previous edition. GRA

N80-32282# National Technical Information Service, Springfield, Va.
DISTRIBUTED DATA PROCESSING. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Jun. 1979
Brian Carrigan Jun. 1980 254 p Supersedes NTIS/PS-79/0711; NTIS/PS-78/0672
(PB80-812233; NTIS/PS-79/0711; NTIS/PS-78/0672) Avail: NTIS HC $30.00/MF $30.00 CSCL 09B

The bibliography of worldwide journal literature cites studies on the concepts, design, development, implementation, and application of distribution data processing. Also included are studies on distributed data bases. General communication studies related to major computer networks are cited in another bibliography. This updated bibliography contains 243 abstracts, none of which are new entries to the previous edition. GRA

N80-33294# Computer Corp. of America, Cambridge, Mass.
FUNDAMENTAL ALGORITHMS FOR CONCURRENCY CONTROL IN DISTRIBUTED DATA BASE SYSTEMS Final Technical Report, Jul. 1979 - Jan. 1980
Philip A. Bernstein and Nathan Goodman Griffiss AFB, N.Y. RADC May 1980 267 p refs
(Contract F30602-79-C-0191; AF Proj. 5581; AF Proj. 2530)
(AD-A087996; RADC-TR-80-158) Avail: NTIS HC A12/MF A01 CSCL 09/2

The state-of-the-art in distributed database concurrency control is consolidated. The heart of the analysis is a decomposition of the concurrency control problem into two major sub problems: read-write and write-write synchronization. A series of synchronization techniques for solving each sub-problem are described and it is shown how to combine synchronization techniques into algorithms that solve the entire concurrency control problem. Algorithms constructed in this way are called concurrency methods. Forty-eight principal concurrency control methods are described. These methods include all practical algorithms for distributed database concurrency control that have appeared in the literature plus several new algorithms. In addition, an analysis of principal concurrency control methods in qualitative terms is performed. The analysis considers four cost factors: communication overhead, local processing overhead, transaction restarts, and transaction blocking. Results indicate that only about 10 of the principal concurrency control methods are reasonable choices in practice. Author

N80-34285 Texas Univ. at Austin.
A METHODOLOGY FOR LOGICAL DESIGN OF DATABASES FOR PROJECT ENGINEERING Ph.D. Thesis
Alejandro Pablo Buchmann 1980 314 p
Avail: Univ. Microfilms Order No. 8021410

The application of database technology to process plant design is examined. The logical design of a project-wide database is developed. The need is identified for a flexible database architecutre which permits the logical database design to be independent of the database management system (DBMS). A three schema architecture is proposed and the conceptual schema is divided into a global view in terms of a conceptual model and a logical schema in the data description language of the DBMS chosen for implementation. Binary associations are used for the conceptual model. A set of criteria for the evaluation of logical database design methodologies is presented and a methodology which complies with these criteria is synthesized. An integral part of this methodology is the use of a binary associative data dictionary that provides for computer-aided handling of database design information and assists in performing the tasks of the logical database design. The binary associative global view of a database capable of handling the process release information for the deethanizer section of an ethylene plant is designed and tested. Dissert. Abstr.

N80-34286# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
DATABASE DESIGN: CHOICE OF A METHODOLOGY
M. C. F. King, G. Naude, and S. H. vonSolms (Rand Afrikaans Univ., Johannesburg, South Africa) Dec. 1979 17 p refs
(CSIR-TWISK-102) Avail: NTIS HC A02/MF A01

Aspects are discussed of the practical application of recent relational theory. The relevant definitions, extracted from various papers, were restated using a common notation. An attempt is made to describe unambiguously two competing design procedures: synthesis and 4NF decomposition, as a basis for the discussion. It is argued that the key structure of the synthesized relations models the real world naturally; that the nonloss criterion has questionable validity in practice; that uniqueness is equally a problem in both procedures; and that multivalued dependencies are difficult to recognize. Author

N80-34287# Radian Corp., McLean, Va.
THE REVISED ORGANIC CHEMICAL PRODUCERS DATA BASE SYSTEM Interim Final Report
G. E. Wilkins, C. H. Tucker, and E. D. Gibson Jun. 1980 172 p refs
(Contract EPA-68-03-2623)
(PB80-199805; RAD-TN-200-223; EPA-600/2-80-164) Avail: NTIS HC A08/MF A01 CSCL 05B

The revised Organic Chemical Producers Data Base, an automated chemical information system developed for the U.S. Environmental Protection Agency (EPA) is described. Improvements were made in two ways: (1) expansion of the data base to include more chemicals and more information about each and (2) implementation of the system through a data base management system. Chemicals are described by Chemical Abstracts Services registry number, Wiswesser Line Notation, industrial process descriptions, chemical uses, synonyms, toxicity, economic data, and producers. GRA

N80-34288# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.
ENVIRONMENTAL ASSESSMENT DATA SYSTEMS: TERMINOLOGY REFERENCE MANUAL Final Report, May - Nov. 1979
R. J. Larkin and B. Ballard Feb. 1980 225 p
(Contract EPA-68-02-2699)
(PB80-197916; EPA-600/8-80-011) Avail: NTIS HC A10/MF A01 CSCL 05B

A general reference manual is presented on the terminology used to enter and retrieve information from the Environmental Assessment Data Systems (EADS), a group of interrelated computerized data bases that describe multimedia discharges. The EADS was designed to aid researchers in environmental assessment source characterization, and control technology development. The report contains the standard nomenclature or terminology used to describe certain data categories in the waste stream data bases. To selectively retrieve data from the waste stream data bases, consistent terminology must be used if the computer search is to obtain an exact match. The report contains terminology to be used to categorize sources, describe control technology, identify chemical compounds and elements, describe analytical methods in sample analysis, and list other data. The terminology applies to particle, gas, liquid, and solid discharge effluent streams. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

A77-27512 **Air Force design-to-cost methodology development.** R. J. Hirt (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio). In: Bicentennial of materials progress; Proceedings of the Twenty-first National Symposium and Exhibition, Los Angeles, Calif., April 6-8, 1976. Azusa, Calif., Society for the Advancement of Material and Process Engineering, 1976, p. 923-933.

The paper discusses drawbacks pertinent to present design-to-cost methodology for cost-effective selection of candidate composite materials. A new approach called the Advanced Composite Cost Estimating Manual program is described which is a five-task effort that combines the speed of the parametric approach with the accuracy of the industrial engineering approach. Task I is intended to establish the data base, while Task II uses the results of data analysis along with industrial engineering projections to develop cost elements standards. In Task III, standard estimating relationships are developed to determine the manhours that are required to perform a task, and cost estimating relationships are established to relate recurring labor costs to the system parameters. In Task IV, cost projection guidelines are developed. Task V consists of the program documentation to provide user confidence in program capability. The usefulness of the program in providing a detailed analysis on how costs are incurred can be invaluable to the user. Future considerations must include the missing elements of life cycle cost for advanced composites. S.D.

A77-38221 **The Energy Supply Planning Model - A working tool for regional analysis of alternative national energy policies.** M. Carasso and J. M. Gallagher (Bechtel Corp., San Francisco, Calif.). In: Modeling and simulation. Volume 7 - Proceedings of the Seventh Annual Pittsburgh Conference, Pittsburgh, Pa., April 26, 27, 1976. Part 2. Pittsburgh, Pa., Instrument Society of America, 1976, p. 1041-1048. NSF-supported research.

The paper describes the general features and capabilities of the Energy Supply Planning Model - a quantitative tool developed for aiding in the evaluation of the feasibility of various proposed U.S. energy scenarios in terms of specific societal resources required for the construction and operation of energy supply and energy transportation facilities needed to implement these scenarios. Given a candidate future energy mix of interest, the model computes by year the number of new energy facilities of various types that must be brought on-stream to supply the mix. Given user specification, the model then locates the facilities in one of 14 regions of the U.S., allocates fuels to the demand of the 11 land regions, and calculates transportation facilities required. Direct capital, manpower, and materials needed and when they are needed are then calculated. P.T.H.

A78-49990 **An analytical method of defining low life cycle cost avionics.** W. D. Bloxon (Boeing Wichita Co., Wichita, Kan.) and C. D. Kennedy (USAF, Aeronautical Systems Div., Wright-Patterson AFB, Ohio). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 1222-1224.

The present study provides a basis for defining a modernized strategic avionics system to meet the improved performance and reduced operation and maintenance costs to support strategic operational requirements in the 1980s. The analysis shows that a dramatic cost effectiveness improvement can be achieved over the baseline and that current technology will support the guide requirements for life cycle cost and performance. In order to meet SAC's requirements, the following features are necessary: improved radar resolution; high jamming resistant terrain following radar; good radar performance in weather; radar image freeze; Class I inertial system; low altitude penetration; and redundancy for mission success. V.P.

A79-13870 # **Future solar total energy markets for the U.S. industrial sector.** L. R. Bush and P. K. Munjal (Aerospace Corp., El Segundo, Calif.). *American Institute of Aeronautics and Astronautics and Arizona Solar Energy Research Commission, Conference on Solar Energy: Technology Status, Phoenix, Ariz., Nov. 27-29, 1978, AIAA Paper 78-1773.* 9 p. Research supported by the U.S. Department of Energy.

A computerized market penetration model has been developed to forecast commercialization of solar total energy systems in the U.S. industrial sector. The model makes use of performance relationships developed through extensive computer simulation which define solar system economics and energy displacement by fuel type as functions of industrial application characteristics (thermal-to-electric ratio, phasing, size), solar isolation and price of competing fuels. Results are presented for 140 industries, 50 states, and 7 time periods from 1985 through 2015. Aggregated national totals indicate that considerable fuel displacement can be achieved by 1990, and even earlier if government incentives are employed. (Author)

A79-38646 **Analysis of the economic potential of solar thermal energy to provide industrial process heat in the United States.** G. C. Szego and M. D. Fraser (InterTechnology/Solar Corp., Warrenton, Va.). In: International Solar Forum, 2nd, Hamburg, West Germany, July 12-14, 1978, Reports. Volume 2.
Munich, Deutsche Gesellschaft für Sonnenenergie, 1978, p. 469-481. Contract No. EY-76-C-02-2829.

An analysis was made of the potential applications of solar thermal energy to provide process heat for industry in the U.S. The important characteristics, including performance and cost, of various solar thermal energy systems were identified, summarized, and compared. An industrial process heat data base was developed with detailed information, including temperature, on heat used in specific applications. These data were analyzed to identify feasible solar process heat applications. This quantitative assessment indicated a maximum potential of solar process heat of 0.6 quadrillion Btu (0.6 quadrillion kJ) per year in 1985, and 7.3 quadrillion Btu (7.7 quadrillion kJ) per year in 2000. (Author)

N76-21022# Army Aviation Systems Command, St. Louis, Mo. Office of the Comptroller.
SOURCES AND NATURE OF COST ANALYSIS DATA BASE REFERENCE MANUAL Interim Report
Ralph W. Lilge Sep. 1975 108 p refs
(AD-A016116; USAAVSCOM-TR-75-37) Avail NTIS CSCL 15/5

Citing specific examples, the report examines, evaluates, analyzes, and portrays the sources and nature of the cost analysis data base emphasizing important interrelationships between process (gathering, normalization, evaluation), professional skill requirements, the planning of future report revisions, and the development of new data sources. For analysis, the main body of the report employs an expanded 13-step format. Entries on the format were obtained from personal interviews. The report is organized to permit future changes and to facilitate cross-referencing. GRA

N76-21024# General Dynamics/Convair, San Diego, Calif.
WEAPON SYSTEM COSTING METHODOLOGY FOR AIRCRAFT AIRFRAMES AND BASIC STRUCTURES. VOLUME 2: ESTIMATING HANDBOOK AND USER'S MANUAL, PART 1 Final Report, Jul. 1972 - Feb. 1975
R. E. Kenyon May 1975 184 p
(Contract F33615-72-C-2083; AF Proj. 1368)
(AD-A016409; AFFDL-TR-75-44-Vol-2-Pt-1) Avail NTIS CSCL 01/3

This volume provides a detailed description of the function and use of two weapon system costing methodologies for aircraft airframes and basic structures developed for the Air Force Flight Dynamics Laboratory for use in conceptual and preliminary designs phases of weapon system development. The methods are a trade study costing method for detailed cost analysis of trades-off between weight, cost, type of construction and type of material and a system costing method for determining the projected cost of a complete airframe within the context of a weapon system development. This volume describes how to make an estimate using either technique and shows the results of a demonstration case. Tradeoff capability has been provided for a range of alternative structure and material combinations. A technique for independent assessing complexity factor has been developed and demonstrated. Manufacturing costs are separately estimated for the primary elements of substructure: ribs, spars, covers, leading edges, trailing edges, tips, etc. The trade study method provides an iterative capability stemming from a direct interface with design synthesis programs. A detailed cost data base and system for data expansion are provided. The methods are designed for ease in changing cost estimating relationships and estimating coefficients resulting from cost data update. Author (GRA)

N76-24065# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
SPEECH UNDERSTANDING SYSTEMS Quarterly Technical Progress Report, 1 Aug. - 29 Oct. 1975
William A. Woods, M. Bates, G. Brown, Bertram Bruce, and Craig Cook Nov. 1975 116 p refs
(Contract N00014-75-C-0533; ARPA Order 2904)
(AD-A018683; BBN-3188; QTPR-4) Avail: NTIS CSCL 05/7

This report describes recent progress of the BBN speech understanding. The BBN speech understanding project is an effort to develop a continuous speech understanding system which uses syntactic, semantic and pragmatic support from higher level linguistic knowledge sources to compensate for the inherent acoustic indeterminacies in continuous spoken utterances. These knowledge sources are integrated with sophisticated signal processing and acoustic-phonetic analysis of the input signal, to produce a total system for understanding continuous speech. The system contains components for signal analysis, acoustic parameter extraction, acoustic-phonetic analysis of the signal, phonological expansion of the lexicon, lexical matching and retrieval, syntactic analysis and prediction, semantic analysis and prediction, pragmatic evaluation and prediction, and inferential fact retrieval and question answering, as well as synthesized text or spoken output. The report summarizes the fourth year of a five-year development effort. GRA

N77-11909# California Univ., Berkeley. Lawrence Berkeley Lab.
DYNAMIC PROGRAMMING APPROACH TO ESTIMATING GAPS IN LARGE ECONOMIC DATA BASES
F. M. Andres, H. Ruderman, and J. Sathaye Sep. 1975 20 p refs Presented at Operations Res. Soc. of Am. Conf., Las Vegas, Nev., 16 Nov. 1975
(Contract W-7405-eng-48)
(LBL-4271; Conf-751176-1) Avail: NTIS HC A02/MF A01

A suboptimal dynamic programming algorithm is proposed to find a maximum likelihood estimator of the missing data items. (ERA)

N77-17940*# Lockheed Missiles and Space Co., Sunnyvale, Calif. Space Systems Div.
LOW COST PROGRAM PRACTICES FOR FUTURE NASA SPACE PROGRAMS, VOLUME 1 Final Report, Jun. 1974 - Dec. 1975
15 Dec. 1975 65 p
(Contract NASw-2752)
(NASA-CR-149656; LMSC-D469858-Vol-1; LMSC-D469857-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 05C

The progress and outcomes of a NASA/HQ indepth analysis of NASA program practices are documented. Included is a survey of NASA and industry reaction to the utility and application of a Program Effects Relationship Handbook. The results and outcomes of all study tasks are presented as engineering memoranda as the appendix. Author

N77-21124*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A MAINTENANCE AND OPERATIONS COST MODEL FOR DSN
R. W. Burt and H. L. Kirkbride *In its* The Deep Space Network 15 Apr. 1977 p 109-114

Avail: NTIS HC A11/MF A01 CSCL 05C

and a system costing method for determining the projected cost of a complete airframe within the context of a weapon system development. This volume describes how to make an estimate using either technique and shows the results of a demonstration case. Tradeoff capability has been provided for a range of alternative structure and material combinations. A technique for independent assessing complexity factor has been developed and demonstrated. Manufacturing costs are separately estimated for the primary elements of substructure: ribs, spars, covers, leading edges, trailing edges, tips, etc. The trade study method provides an iterative capability stemming from a direct interface with design synthesis programs. A detailed cost data base and system for data expansion are provided. The methods are designed for ease in changing cost estimating relationships and estimating coefficients resulting from cost data update. Author (GRA)

N80-10962*# ECON, Inc., Princeton, N. J.
A STUDY OF THE COST-EFFECTIVE MARKETS FOR NEW TECHNOLOGY AGRICULTURAL AIRCRAFT
George A. Hazelrigg, Jr. and Fred Clyne Sep. 1979 161 p
(Contract NASw-2781)
(NASA-CR-159090) Avail: NTIS HC A08/MF A01 CSCL 05C

A previously developed data base was used to estimate the regional and total U.S. cost-effective markets for a new technology agricultural aircraft as incorporating features which could result from NASA-sponsored aerial applications research. The results show that the long-term market penetration of a new technology aircraft would be near 3,000 aircraft. This market penetration would be attained in approximately 20 years. Annual sales would be about 200 aircraft after 5 to 6 years of introduction. The net present value of cost savings benefit which this aircraft would yield (measured on an infinite horizon basis) would be about $35 million counted at a 10 percent discount rate and $120 million at a 5 percent discount rate. At both discount rates the present value of cost savings exceeds the present value of research and development (R&D) costs estimated for the development of the technology base needed for the proposed aircraft. These results are quite conservative as they have been derived neglecting future growth in the agricultural aviation industry, which has been averaging about 12 percent per year over the past several years. A.R.H.

N80-21196# Union Carbide Corp., Oak Ridge, Tenn. Computer Sciences Div.
DESCRIPTION OF DATA ENTRY FOR AUTOMATED COST ESTIMATING
N. H. VanWie Oct. 1979 40 p
(Contract W-7405-eng-26)
(K/CSD/TM-29-Rev-1) Avail: NTIS HC A03/MF A01

A series of computer programs, developed to aid the computational and reporting phases of preparing a project cost estimate are presented. The data base for a project is subdivided into three types of data or files: a title file, a nucleus file, and a file of cost sheets with optional schedules. The data requirements and formatting specifications for preparation of these files are described. Examples are presented and alternative approaches to accomplish an end result are explained. DOE

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

No abstracts in this category.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see 03 Air Transportation and Safety, 16 Space Transportation, and 44 Energy Production and Conversion.

A77-26410 # **Development of a data base for the future regulation of flue gas desulfurization sludge disposal.** J. P. Woodyard, D. E. Weaver (SCS Engineers, Long Beach, Calif.), and D. E. Sanning (U.S. Environmental Protection Agency, Cincinnati, Ohio). *American Society of Mechanical Engineers, Winter Annual Meeting, New York, N.Y., Dec. 5-10, 1976, Paper 76-WA/APC-5.* 17 p. 8 refs. Members, $1.50; nonmembers, $3.00.

The data base evaluation study considered has the objective to assess the potential for environmental degradation imposed by flue gas desulfurization (FGD) sludges, and to determine the ability of existing technologies to cope with this problem. Attention is given to the characteristics of FGD sludge, the sludge generation mass balance, approaches for FGD sludge disposal, environmental criteria for sludge disposal, and details concerning the existing standards and regulations. G.R.

A77-51286 # **Chicago urban transportation planning.** H. E. Nelson and W. L. Barnes (Chicago Urban Transportation District, Chicago, Ill.). *(American Society of Civil Engineers, Annual Convention and Exposition, Philadelphia, Pa., Sept. 27-Oct. 1, 1976.) American Society of Civil Engineers, Urban Planning and Development Division, Journal*, vol. 103, July 1977, p. 53-67. 5 refs.

An integrated transportation/land use model for urban planning is developed for application to rapid transit problems in the Chicago municipal area. The Chicago Central Area Transit Project (CATP) is designed to: improve distributions of transit and railroad commuter passengers within the Chicago central area (Loop and environs), extend rapid transit service to now underserved areas, and enhance the economic and environmental states of the downtown area with removal of the antiquated elevated train structure. Special problems to be overcome in the Chicago area are indicated. Transportation Engineering Program (TEP) procedures, formats, and data base organization are described. R.D.V.

A79-11387 # **LANDSAT for ABAG - The integration of remote sensing with a geographic data base for regional planning.** M. Modelski (Association of Bay Area Governments, Berkeley, Calif.). In: Conference on the Economics of Remote Sensing Information Systems, 1st, San Jose, Calif., January 19-21, 1977, Proceedings. San Jose, Calif., San Jose State University, 1977, p. 245-252. 22 refs.

A brief summary is provided of the current status and proposed plans for the Bay Area Spatial Information System (BASIS). BASIS is being developed by the Association of Bay Area Governments (ABAG) which represents cities and counties in the 9-county San Francisco Bay Region. BASIS is a grid-based minicomputer geoprocessing system. A major component of the system's data base includes Landsat remotely sensed multispectral scanner data. ABAG's geoprocessing hardware includes a processor with 192,000 16-bit words of semiconductor memory, a 93 megabyte disk, and a 300 line/minute line printer. Attention is also given to existing system software, existing application software, geographic data management software, current Landsat activities, and proposals for additional software. G.R.

A79-30910 **Failure data analysis for transit vehicles.** C. Singh (Ministry of Transportation and Communications, Systems Research and Development Branch, Downsview, Ontario, Canada) and M. D. Kankam (Ontario Hydro, Power System Operation Div., Toronto, Canada). In: Annual Reliability and Maintainability Symposium, Washington, D.C., January 23-25, 1979, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1979, p. 308-313. 6 refs.

This paper describes an effort to create a data base for the reliability of transit vehicles and their components. Failure data on approximately 500 subway cars, 400 streetcars and 1100 buses was obtained from the Toronto Transit Commission. The results of the analysis of this data are summarized in this paper and reference to more detailed information is provided. (Author)

N76-32085# Transportation Data Coordinating Committee, Washington, D.C.

GENERAL PROGRAMMING SPECIFICATION FOR A PROTOTYPE ELECTRONIC DATA INTERCHANGE SYSTEM Final Report, Jul. 1975 - Apr. 1976

J. Carley, R. Notto, E. Bass, A. Kreithen, and E. Gilbert 30 Apr. 1976 100 p
(Contract DOT-OS-50017)
(PB-252936/0) Avail: NTIS HC $5.00 CSCL 13B

A programming specification is presented for electronic data interchange of transportation information between shippers, carriers, forwarders, and banks which may be used for estimating, design, and development purposes. This specification was prepared in conjunction with working groups composed of participants from the transportation industry. GRA

N76-34063# Ultrasystems, Inc., Phoenix, Ariz. Dynamic Science Div.

AUTOMOBILE CONSUMER INFORMATION STUDY CRASH TEST PROGRAM. VOLUME 1: SUMMARY REPORT Final Report, Jun. 1974 - Dec. 1975

Richard W. Carr Apr. 1976 26 p refs
(Contract DOT-HS-4-00909)
(PB-252428/2; DOT-HS-801-875; Rept-8268-75-190) Avail: NTIS HC $4.00 CSCL 13F

Test methodology for a series of vehicle rating tests was developed to produce a data base for use in determining crashworthiness and damage susceptibility ratings for contemporary automobiles. The crash test program was conducted over a 15-1/2 month period and was divided into two phases. The Phase I requirements were for ten crash tests of two 1973 intermediate size automobiles. These tests included rigid barrier, moving barrier, and car to car impacts, at speeds ranging from 15 to 30 mph. Phase II involved twelve crash tests of the comparable 1974 intermediate size automobiles. These tests included only rigid barrier, frontal impacts, and car to car front to rear impacts at speeds ranging from 8 to 35 mph. Author (GRA)

N77-10966# Washington Univ., Seattle. Urban Transportation Program.

A PRELIMINARY SYSTEMS DESIGN FOR A MULTI-PURPOSE TRANSIT PLANNING AND MANAGEMENT INFORMATION SYSTEM

Thomas Walter Friedman Mar. 1976 102 p refs
(Contract FWPCA-WA-11-0005)
(PB-255178/6; RR-76-1; UMTA-WA-11-0005-76-1) Avail: NTIS HC A06/MF A01 CSCL 13B

A preliminary systems design for a multi-purpose transit planning and management information system is presented. It conceptualizes two such information systems: one for the automation of transit schedule data for the production of scheduling related reports, and the other for the automation of transit schedule data and street network data for a general transit information system. While the former system is designed to produce the types of reports currently manually produced and in use by the transit industry, the latter system is intended to provide an automated data base for the planning and marketing of transit services. Transit properties and others with an efficient file structure for organizing schedule data for the production of various types of output based on the concept of random access search are provided. GRA

N77-12946# Mitre Corp., McLean, Va.

DATA BASE DESIGN FOR DEMAND-RESPONSIVE TRANSIT

Virgil S. Thurlow and Sam Winchester Jul. 1976 93 p
(Contract DOT-UT-50018)
(PB-256820/2; MTR-7254; UMTA-VA-06-0024-76-2) Avail: NTIS HC A05/MF A01 CSCL 13B

A data base for demand-responsive transit operations was designed to provide for systematic reporting and to be a standard of comparison between transit operations. The data base design is presented in the form of data sheets that may be used directly for recording information about transit operations. Subjects included in the data base include urban characteristics, ridership, costs, and services. Steps necessary for the complete development of a data base include design tests, analytical validity, design revision, and development of reporting procedures and maintenance. This manual data base system is structured so that it may be automated at a future time. GRA

N77-22010# Garland Urban Observatory, Tex.

ANIMAL CONTROL: THE DEVELOPMENT OF A DATA BASE Final Report

A. J. Flowers and Johnny Heussner Jun. 1976 28 p refs
(Contract HUD-H-2198)
(PB-260472/6: UO-LCOM-GAR-76-005) Avail: NTIS HC A03/MF A01 CSCL 13B

A survey was conducted to determine the number of owned and unowned pets in Garland, Texas. The data acquired were analyzed to provide a census of the animal population, and to estimate the population growth assuming no programmatic intervention is inaugurated. GRA

N77-22017# Mitre Corp., McLean, Va. METREK Div.
DEMAND RESPONSIVE TRANSPORTATION PLANNING GUIDELINES (1976)
Cady C. Chung and John R. Ferrantino Oct. 1976 81 p refs Revised
(Contract DOT-UT-50016)
(PB-261314/9: MTR-7360: UMTA-VA-06-0024-76-6) Avail: NTIS HC A05/MF A01 CSCL 13B

Demand Responsive Transportation (DRT) is a type of transit operation providing 'on-demand,' door-to-door service with small buses. More than forty DRT services are now operating in the U.S. These systems provide the data base for a set of relationships which can be used for planning and design of new DRT systems. In addition, the experience of active operators emphasizes a number of important steps in developing successful DRT services. GRA

N77-27036# California Univ., Livermore. Lawrence Livermore Lab.
TRANSPORTATION-RELATED DATA BASES EXTRACTED FROM THE NATIONAL INDEX OF ENERGY AND ENVIRONMENTAL DATA BASES. PART 1: DIGEST OF DETAILED DATA BASE DESCRIPTIONS
E. W. Birss and J. W. Yeh 15 Nov. 1976 133 p
(Contract W-7405-eng-48)
(UCID-17316-Pt-1) Avail: NTIS HC A07/MF A01

Lawrence Livermore Laboratory (LLL) extracted a set of 135 transportation-related data bases from a computerized national index of energy and environmental data bases which LLL had produced for the Division of Biomedical and Environmental Research of the Energy Research and Development Administration. These 135 data bases, which relate to the intersection of the energy and transportation fields, initially served as a model for designing a questionnaire for transportation-related data bases and were subsequently converted into a DOT survey data base format. A digest and detailed description of each data base is presented. The format includes: data base name, administrative control and technical content personnel, data base category, coverage and availability, hardware/software environment, documentation and application, and abstract and objectives. ERA

N77-27037# California Univ., Livermore. Lawrence Livermore Lab.
TRANSPORTATION-RELATED DATA BASES EXTRACTED FROM THE NATIONAL INDEX OF ENERGY AND ENVIRONMENTAL DATA BASES. PART 2: DETAILED DATA BASE DESCRIPTIONS
E. W. Birss and J. W. Yeh 15 Nov. 1976 277 p
(Contract W-7405-eng-48)
(UCID-17316-Pt-2) Avail: NTIS HC A13/MF A01

For abstract, see N77-27036.

N77-27041# DeLeuw, Cather and Co., Houston, Tex.
URBAN TRAFFIC CONTROL SYSTEM TRAFFIC ADAPTIVE NETWORK SIGNAL TIMING PROGRAM. VOLUME 2: DATA BASE INTERFACE AND SUPPORT SUBROUTINES: MODIFIED FIRST GENERATION ROUTINES Final Report
R. W. Kessmann Aug. 1976 295 p 3 Vol.
(Contract DOT-FH-11-7594)
(PB-264065/5: FHWA-RD-76-126-Vol-2) Avail: NTIS HC A13/MF A01 CSCL 13B

The Traffic Adaptive Newtwork Signal Timing Program (TANSTP) is a second generation traffic control package wherein optimal traffic signal timing patterns are generated on-line as a function of current and predicted traffic flow conditions to minimize average network vehicle delay. In addition to the network optimization routine, the package includes a traffic flow predictor, realtime subnetwork determination routine, a subnetwork interfacing routine, a transition optimization routine, and a local intersection optimization routine which adjusts splits and offsets to minimize delay on a cycle by cycle basis. The TANSTP package uses the executive structure, the detector processing, and the controller command software of the first generation, UTCS software. GRA

N77-27043# Environmental Protection Agency, New York. Data Systems Branch.
THE COMPUTATION AND GRAPHICAL DISPLAY OF THE NSF WATER QUALITY INDEX FROM THE STORET DATA BASE USING THE INTEGRATED PLOTTING PACKAGE. PROGRAM DOCUMENTATION AND USERS GUIDE Final Report
George A. Nossa Oct. 1976 98 p refs
(PB-264670/1: WQI-001) Avail: NTIS MF A01 CSCL 13B

The NSF-Water Quality index is a numerical expression which reflects the composite influence of nine physical, chemical and bacteriological parameters to water quality. It was developed and has been widely field tested by the National Sanitation Foundation as a means for reporting the current status and trends of water quality. Documentation includes the logic and operation of three computer programs developed to present this index in report and/or graphical form using the Storet Database as input and the graphics capability of the Integrated Plotting Package. Data from the Raritan Basin is presented as a test application. GRA

N77-22084# University of Southern Calif., Los Angeles. Dept. of Industrial and System Engineering.
CHARACTERISTICS OF MULTILANE TRAFFIC FLOW FROM AERIAL DATA Final Technical Report, 1975 - 1976
R. Agahi, A. V. Gafarian, P. Jagger, L. T. Nguyen, and J. Pahl Oct. 1976 135 p refs
(Contract DOT-OS-50122)
(PB-267683/1: TR-76-2: DOT-TST-76-T/2) Avail: NTIS HC A07/MF A01 CSCL 13B

A discrete data base, developed from time-lapse photography with a helicopter mounted camera, was used to produce continuous car trajectories showing location, speed, and acceleration as a function of time. Microscopic and macroscopic characteristics of multilane traffic flow were determined from these trajectories. The microscopic results consist of statistical descriptions of the behavior of individual vehicles which are either in a car following situation because they are unable to pass or who are in the process of accepting a gap in an adjacent lane when they are able to change lanes. The macroscopic results consist of statistical descriptions of traffic density which is a bulk parameter representing the number of cars in a given roadway section. GRA

N78-21010# Washington Univ., Seattle. Urban Transportation Program.
UTILIZING GEOGRAPHIC BASEFILES FOR TRANSPORTATION ANALYSIS: A NETWORK BASEFILE SYSTEM Research Report, Jul. 1976 - Jun. 1977
Claus D. Gehner Jun. 1977 46 p refs Sponsored by Urban Mass Transportation Admin.
(PB-275598/6: RR-77-3: UMTA-WA-11-0006-78-1) Avail: NTIS HC A03/MF A01 CSCL 13B

The existence of geographic base files (GBF) for most large urban areas offers a significant resource for the network models required for many transportation studies. The thrust of the Network Basefile System (NETBASIS) development, underway at the University of Washington since 1974, is to build upon the existing GBF data resource (which has been operational for the city of Seattle for many years) and to provide a general purpose transportation network data base together with the required data manipulation and display software. A status report on the NETBASIS development as of June 1977 is presented. GRA

N78-31012# SCS Engineers, Long Beach, Calif.
DATA BASE FOR STANDARDS/REGULATIONS DEVELOPMENT FOR LAND DISPOSAL OF FLUE GAS CLEANING

85 URBAN TECHNOLOGY AND TRANSPORTATION

SLUDGES Final Report
Dallas E. Weaver, Curtis J. Schmidt, and John P. Woodyard
Dec. 1977 299 p refs
(PB-280135/5; EPA-600/7-77-118) Avail: NTIS
HC A13/MF A01 CSCL 13B

Flue gas cleaning (FGC) sludge disposal on land is considered from a potential regulatory approach. Factors that were taken into consideration include: (1) the origin of the FGC sludge problem (character of the fuel, combustion process, gas cleaning and sludge management); (2) criteria for the evaluation of sludge disposal options (sludge characteristics, health, ecological, safety, and aesthetic considerations); (3) applicable, existing or proposed standards/regulations (solid waste hazardous waste, drinking water, and air pollution regulations); and (4) impacts of applying existing standards/regulations to the disposal of flue gas cleaning sludges (cost aspects). GRA

N79-18944/ National Rural Center, Washington, D. C.
THE NATIONAL RURAL CENTER'S INFORMATION CLEARINGHOUSE: A REPORT ON ITS ACCOMPLISHMENTS AND ACTIVITIES, DECEMBER 1977 THROUGH SEPTEMBER 1978 Final Report
Sep. 1978 27 p
(Contract EDA-99-6-09521)
(PB-288895/8; EDA-78-0140) Avail: NTIS HC A03/MF A01
CSCL 05B

A report is given on the accomplishment and activities of the National Rural Center's Information Clearinghouse for December 1977 through September 1978. The report is an explanation of the structure, operations and programs of the Clearinghouse, which is a service of the National Rural Center. The report reviews activities to increase outreach, intergovernmental and interorganizational programs, and comments briefly on future plans. GRA

N79-27030/ Patent and Trademark Office, Washington, D. C. Office of Technology Assessment and Forecast.
TECHNOLOGY ASSESSMENT AND FORECAST REPORT
Dec. 1977 191 p
(PB-293380/2) Avail: NTIS HC A09/MF A01 CSCL 05B

In order to stimulate and enhance the use and usability of the classified patent search file which contains twenty two million technological documents, and to assemble, analyze and make available meaningful data about the file, the Patent and Trademark Office compiled a master data base covering all U.S. patents which it periodically updates. The data base is used in the preparation as well as periodically issued general distribution publications in the preparation of special reports, tailored to individual needs. These reports, which are provided on a cost reimbursable basis are utilized by other government agencies and a number of private sector organizations. GRA

N79-30101 International Institute for Applied Systems Analysis, Laxenburg (Austria).
POSSIBILITIES AND NEEDS FOR DATA BASES FOR SANT WITH SPECIAL REFERENCE TO THE INTERNATIONAL LEVEL
W. D. Rauch *In its* Systems Assessment of New Technol. Intern. Perspectives Aug. 1978 p 67-84 refs

Avail: Issuing Activity

The data base aspect of Systems Assessment of New Technology (SANT) is discussed. Needs are classified in terms of management requirements. Types of influence relevant to SANT are described. Special problems on the international level and a list of international computerized data banks are presented. Author (ESA)

N79-34101/ National Bureau of Standards, Washington, D. C. Office of International Relations.
THE TECHNICAL KNOWLEDGE BASE FOR INDUSTRIALIZING COUNTRIES: PROCEEDINGS OF THE NBS/AID UNCSTD (UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT) Final Report
Raymond C. Sangster, ed. Apr. 1979 241 p refs Seminar held at Gaithersburg, Md., 16-17 Oct. 1978 Sponsored in part by US Coordinator for the UN Conference on Science and Technology for Development, and Agency for International Development, Washington, D.C.
(Grant PASA-TA(CE)-5-71)
(PB-294984/0; NBS-SP-543; LC-79-600058) Avail: NTIS HC A11/MF A01 CSCL 05B

The establishment of a technological knowledge base for industrializing countries is discussed. The areas covered include measurement capabilities and services required by technological industry, national and international standards required by industrializing nations, acquisition of commercial industrial technology, and industrial quality control. GRA

88 SPACE SCIENCES (GENERAL)

A80-24354 **A conservative estimate of the number of habitable planets in the Galaxy. II - Defence and revision of the estimate.** A. Bond and A. R. Martin (Atomic Energy Research Establishment, Culham Laboratory, Abingdon, Oxon, England), *British Interplanetary Society, Journal (Interstellar Studies)*, vol. 33, Mar. 1980, p. 101-106. 20 refs.

This paper presents a defence of the arguments, and a revision of the numbers where the arguments cannot be justified, of an earlier (1978) conservative estimate for the number of habitable planets in the Galaxy. The revised estimate gives values of 5.3 million habitable planets (mean separation about 140 light years) and 2.4 million planets orbiting stars of sufficient age for intelligent life to have formed (mean separation about 180 light years). The present paper does not, however, make any contribution to the estimate of the probability of such life forming. (Author)

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

A77-33310 * **The University of Texas catalog of ultraviolet and optical stellar data.** S. B. Parsons and J. D. Wray (Texas, University, Austin, Tex.). In: Compilation, critical evaluation and distribution of stellar data; Proceedings of the Thirty-fifth Colloquium, Strasbourg, France, August 19-21, 1976.
Dordrecht, D. Reidel Publishing Co., 1977, p. 93-101.
Contract No. NAS8-31459.

The paper describes a plan to assemble a master catalog of early-type stars to at least 10th magnitude, containing a single value for each magnitude and the spectral type, with information on photometry, known peculiarities, duplicity, etc., which will serve as a collection of ground-based data to aid in the reduction and analysis of ultraviolet spectra obtained with the S-019 experiment on Skylab, in which objective prism photographs recorded nearly 10,000 stars at wavelengths shortward of 3000 A. The starting point is the [illegible] Identification Catalog; several other catalogs will be compiled and merged with this data base. The format for recording the wanted data on magnetic tape and the procedure for assembling the master file are discussed. P.T.H.

A77-33313 **Survey of existing facilities.** C. Jaschek (Strasbourg, Observatoire, Strasbourg, France). In: Compilation, critical evaluation and distribution of stellar data; Proceedings of the Thirty-fifth Colloquium, Strasbourg, France, August 19-21, 1976.
Dordrecht, D. Reidel Publishing Co., 1977, p. 205-279. 39 refs.

A list of all the major existing data centers which are involved with the handling and dissemination of information related to astronomical research is given. The centers are classified under the main branches of astronomy which they cover: solar system, sun, stars, star systems and nonstellar objects, physics, and bibliography. Even within these categories, narrower lines of research are identified, and the relevant data centers are listed. P.T.H.

A80-14026 **Conference on Information Processing Methods, 2nd, Trieste, Italy, February 23, 24, 1979, Proceedings (Convegno sulle Metodologie di Trattamento dell'Informazione, 2nd, Trieste, Italy, February 23, 24, 1979, Proceedings).** Edited by G. A. De Biase (Osservatorio Astronomico, Rome, Italy) and G. Sedmak (Osservatorio Astronomico, Trieste, Italy). *Società Astronomica Italiana, Memorie*, vol. 50, Sept. 1979. 242 p.

The papers reflect the Italian contribution to this rapidly expanding field of data processing. The topics covered include: the design and realization of an astronomical data base; a digital system for data processing; a graphic processor for pseudo-color image representation; a fast updating color video display for interactive applications; numerical mapping of elliptical galaxies by an interactive procedure; application of digital filtering to image processing; and tools for the exploration of structural patterns in digitized astronomical images. V.P.

A80-14029 # **Design and realization of an astronomical data base /BADAS/.** A. Della Ventura and G. Sechi (CNR, Laboratorio di Fisica Cosmica e Tecnologie Relative, Milan, Italy). *(Convegno sulle Metodologie di Trattamento dell'Informazione, 2nd, Trieste, Italy, Feb. 23, 24, 1979.) Società Astronomica Italiana, Memorie*, vol. 50, Sept. 1979, p. 337-352. 5 refs.

The paper deals with the development of a data base specialized in astronomical data, which by its very nature is not adaptable to the use of commercially available data bases. The intention was to provide interested users with a tool for rapid retrieval of information on celestial bodies of various kind and for processing this information. The prerequisites were: independence from specific data; independence from the type of computer system; and ease of access for users V.P.

N78-17953 Cornell Univ., Ithaca, N. Y.
LOW ENERGY GAMMA RAY ASTRONOMY FROM APOLLO 16 Ph.D. Thesis
David Arnold Gilman 1977 129 p
Avail: Univ. Microfilms Order No. 77-28352

Significant variations in the 72 to 200 kilo electron volts gamma ray energy interval were recorded, providing a unique data base for very low energy gamma ray astronomy. Interpretation of the variation observed in terms of sources in the gamma ray sky was studied. The methods of data analysis extend the procedures used in hard X-ray and soft gamma ray astronomy to the case of an extremely large field of view. Exposures were calculated for both point sources and extended sources. A system of equations was established which expresses the counting rate as the sum of the strength of the sources weighted by the exposure. This system was inverted by a weighted-least-squares procedure to determine the source fluxes from the observed counting rates. Dissert. Abstr.

N79-12900*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DIRECTORY OF ASTRONOMICAL DATA FILES
Sep. 1978 140 p
(NASA-TM-79781) Avail: NTIS HC A07/MF A01 CSCL 03A

This Directory of Astronomical Data Files was prepared by the Data Task Force of the Interagency Coordination Committee for Astronomy (ICCA) in cooperation with the National Space Science Data Center (NSSDC). The purpose of the Directory is to provide a listing which will enable a user to locate stellar and extragalactic data sources keyed along with sufficient descriptive information to permit him to assess the value of the files for his use as well as the status and availability of the compilations. G.Y.

N80-32309*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ASTRONOMICAL DATA CENTER BULLETIN, VOLUME 1, NO. 1
Wayne H. Warren, Jr., ed., Theresa A. Nagy, ed., and Jaylee M. Mead, ed. Jul. 1980 54 p refs
(NASA-TM-80784; NSSDC/WDC-A-R/S-80-07-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 03A

Information about work in progress on astronomical catalogs is presented. In addition to progress reports, an updated status list for astronomical catalogs available at the Astronomical Data Center is included. Papers from observatories and individuals involved with astronomical data are also presented. L.F.M.

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

A80-47185 * **A model for gas phase chemistry in interstellar clouds. I - The basic model, library of chemical reactions, and chemistry among C, N, and O compounds.** S. S. Prasad and W. T. Huntress, Jr. (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *Astrophysical Journal Supplement Series*, vol. 43, May 1980, p. 1-35. 102 refs. Contract No. NAS7-100.

N76-21087* Lowell Observatory, Flagstaff, Ariz.
COMET DATA COLLECTIONS
H. L. Giclas *In* NASA. Goddard Space Flight Center The Study of Comets, Part 1 1976 p 127-135

CSCL 03B

Various collections of comet observational material are discussed in terms of developing a data base. Emphasis is placed on observational material buried in the archives of the older observatories. J.M.S.

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

A77-18430 * **Lunar crater arcs.** L. D. Jaffe and E. O. Bulkley (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *The Moon*, vol. 16, Dec. 1976, p. 71-114. 18 refs. Contract No. NAS7-100.

An analysis has been made of the tendency of large lunar craters to lie along circles. A catalog of the craters at least 50 km in diameter was prepared first, noting position, diameter, rim sharpness and completion, nature of underlying surface, and geological age. The subset of those craters 50-400 km in diameter was then used as input to computer programs which identified each 'family' of four or more craters of selected geological age lying on a circular arc. For comparison, families were also identified for randomized crater models in which the crater spatial density was matched to that on the moon, either overall or separately for mare and highland areas. The observed frequency of lunar arcuate families was statistically highly significantly greater than for the randomized models, for craters classified as either late-pre-Imbrian (Nectarian), middle pre-Imbrian, or early pre-Imbrian, as well as for a number of larger age-classes. The lunar families tend to center in specific areas of the moon; these lie in highlands rather than maria and are different for families of Nectarian craters than for pre-Nectarian. The origin of the arcuate crater groupings is not understood. (Author)

A78-41664 * **Applications of a new logical search on the lunar data base for use in pattern recognition classification of Apollo 15 mare basalts.** D. D. Pratt, C. B. Moore, M. L. Parsons, and D. L. Anderson (Arizona State University, Tempe, Ariz.). In: Lunar Science Conference, 8th, Houston, Tex., March 14-18, 1977, Proceedings. Volume 2. New York, Pergamon Press, Inc., 1977, p. 1839-1847. 14 refs. Grant No. NGL-03-001-001.

A79-39126 * **Apollo 17 mare basalt regression and classification studies.** D. D. Pratt, C. B. Moore, and M. L. Parsons (Arizona State University, Tempe, Ariz.). In: Lunar and Planetary Science Conference, 9th, Houston, Tex., March 13-17, 1978, Proceedings. Volume 1. New York, Pergamon Press, Inc., 1978, p. 487-494. 7 refs. Grant No. NGL-03-001-001.

Regression and pattern recognition techniques were applied to 16 chemical species in 34 Apollo 17 basalts. The classification scheme of Pratt et al., (1977) was used. Data were absent for 8 MnO, 3 Hf, 3 Tb, and 8 Cr2O3 analyses. Linear regression studies were utilized to predict these and values obtained were added to the original data base. Pattern recognition techniques were then applied to predict classifications for 30 different Apollo 17 rake basalts analyzed by Murali et al., (1977). (Author)

A80-19405 **Magnetism, shock and metamorphism in chondritic meteorites.** A. Brecher (MIT, Cambridge, Mass.) and M. Fuhrman (Wellesley College, Wellesley, Mass.). *(Topical Conference on Origins of Planetary Magnetism, Houston, Tex., Nov. 8-11, 1978.) Physics of the Earth and Planetary Interiors*, vol. 20, Nov. 1979, p. 350-360. 33 refs.

Comparative magnetic analyses were performed on 26 selected ordinary chondrites belonging to the populous H- and L-chemical groups, with the aim of establishing a statistical data base for characteristic magnetic remanent behavior, to search for relationships between magnetic properties and shock-metamorphic history, and to select samples which have preserved primeval remanent magnetization. The L-chondrites are found to possess fairly well defined magnetic characteristics, whereas H-chondrites are magnetically a much more diverse group. V.P.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N79-32147# Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.

SOLAR ECLIPSE 1979. ATMOSPHERIC SCIENCES LABORATORY PROGRAM OVERVIEW

Melvin G. Heaps, Robert O. Olsen, and Warren W. Berning Feb. 1979 41 p refs

(DA Proj. 1L1-61102-B-53A)

(AD-A068723; ERADCOM/ASL-TR-0026) Avail: NTIS HC A03/MF A01 CSCL 03/3

The 1979 solar eclipse provides a unique opportunity to better understand the interrelationship of many factors which influence the chemical, physical, and electrical structure of the earth's middle atmosphere. An eclipse provides a day-'night'-day transition on the time scale of a few minutes, thus allowing the rapid processes which affect the electron and ion chemistry to be monitored, while assuring that the bulk properties of the neutral atmosphere vary in a regular and predictable manner. Experimental findings from past eclipses have indicated that a very rapid electron attachment/detachment process exists in the D-region which is not reproduced in our present models and yet needs to be explained because of its potential impact on Army communication systems and nuclear weapons effects studies. To better understand these properties of the middle atmosphere, the Atmospheric Sciences Laboratory is helping to coordinate a field experiment program for the 26 February 1979 solar eclipse. GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

No abstracts in this category.

99 GENERAL

No abstracts in this category.

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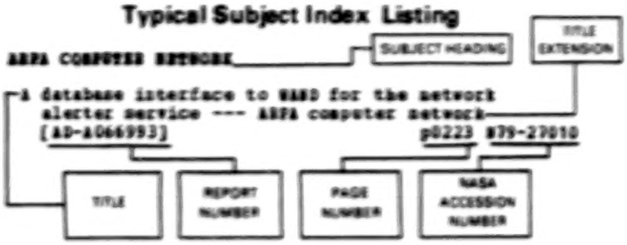

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by three hyphens. If applicable a report number is also included as an aid in identifying the document. The page and accession numbers are located beneath and to the right of the title. Under any one subject heading the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

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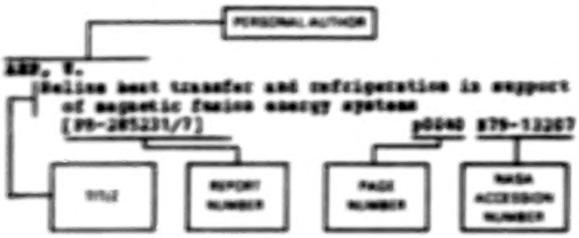

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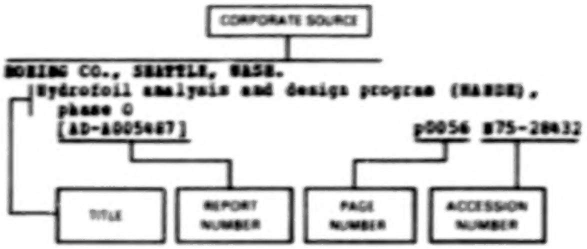

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